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A Contribution
TO THE STUDY OF THE MATERNAL DEATH-RATE.

BY G. F. GIBBERD, M.S. LOND., F.R.C.S. ENG.,
OBSTETRIC REGISTRAR, GUY'S HOSPITAL.

THIS study is based on a comparison of the midwifery in the Guy's Hospital Maternity District as it is to-day and as it was 60 years ago. We know fairly accurately how midwifery was done at Guy's in the days of Galabin and Braxton Hicks. We know how much (or how little) attention was then paid to the prevention of sepsis. We know that there was never any antenatal work. We are fortunate in having an accurate and detailed analysis of the cases that were delivered under these conditions, with a full account of the results obtained. By comparing these results with those of the present day upon a similar group of patients, living under similar conditions, in roughly the same area, and knowing accurately, as we do, the modern methods in use, we may get some valuable information as to how far recent changes in practice have benefited the modern mother. Further, we may discover the faults still to be remedied in our efforts to reduce the present mortality-rate.

MIDWIFERY AT GUY'S IN 1870.

The following account is copied from the report by Galabin published in Guy's Hospital Reports in 1876.[1]

> The district . . . lies within a radius of about a mile from the hospital, and patients are attended at their own homes by the students. A certain number of these, who have already attended a course of lectures on midwifery, are appointed extern obstetric attendants for each month. They reside close to the hospital, and are expected to abstain from visiting the post-mortem and dissecting rooms while they are attending midwifery cases. Two senior students, who have obtained a legal qualification to practise, are appointed resident obstetric assistants and hold office each for one month as junior and one month as senior. They live within the walls of the hospital, and are ready at all times to assist the junior students. The assistant obstetric physician is sent for to superintend all cases in which any obstetric operation is performed.

In the 12 years from October, 1863, to September, 1875, the total number of women delivered was 23,591. There were 106 fatal cases, giving a maternal mortality-rate of 4·4 per 1000. If this figure is compared with the present-day mortality-rate for the country as a whole, we might conclude that the "advances" in midwifery during recent years have led to no decrease in the dangers associated with childbirth. But such a conclusion is not necessarily true, since the comparison is unfair. A much more comparable series is that of the 21,423 "district" cases delivered in the ten years 1919 to 1928 inclusive. This number includes all cases domiciled in the Guy's Hospital district and delivered by the hospital, whether the actual delivery took place in the patient's own home or in hospital. It is difficult to obtain figures of an average practice carried out by a hospital service, since if only patients delivered on the district are considered there will be an unduly low incidence of abnormalities, because the majority of difficult cases will not be delivered in their own homes. If, on the other hand, only patients delivered in hospital are considered, there will, of course, be an undue proportion of difficult cases. By grouping patients according to the area in which they are ordinarily resident we can to some extent eliminate selection. Since the Guy's Hospital district is comparatively small and served by the hospital largely to the exclusion of other practitioners and institutions, these 21,423 district cases can be taken as a fairly representative sample of the general population, in which factors tending to selection have been to a great extent overcome. The only patients excluded are those who were ordinarily resident outside the geographical area of the maternity district.

The 21,423 cases under consideration therefore form a group of average women, as nearly as possible comparable to the group of 23,591 women delivered between 1863 and 1875. In this group (1919–18) there were 22 maternal deaths, giving a maternal mortality-rate of 1·03 per 1000. Thus the maternal mortality-rate in the practice of the Guy's Hospital maternity district during the past ten years is about one-quarter what it was 60 years ago, and this in spite of the fact that obstetric interference is now very much more common. Unfortunately there are no detailed analyses available for recent years before 1928 of the various obstetric abnormalities and operations, but the practice in the Guy's Hospital maternity district has changed but little in the last ten years, and an analysis of the 1679 cases delivered in 1928 may be taken as representing fairly accurately the methods in use during the 1919–28 period.

OBSTETRIC INTERFERENCE.

The following table shows how much more frequently major obstetric interference is resorted to now than it was 60 years ago. The figures for the 1863–75 period have been compiled from Galabin's report published in 1876.[1] The figures for 1928 have been obtained from the Report of the Maternity Department of Guy's Hospital for 1928.[2]

Table I. shows the percentage of cases in which interference was resorted to.

TABLE I.

Nature of operation.	12 years 1863–1875.	Year 1928.
	Per cent.	Per cent.
Forceps	0·51	4·5
Version	0·45	0·3
Craniotomy	0·07	0·18
Cæsarean section	Nil.	1·3
Manual removal of placenta ..	0·32	0·18
Instrumental induction of labour	Nil.	2·4
Total obstetric interference ..	1·35	8·86

It is very unlikely that the enormous increase in obstetric interference can be due to any comparable increase in the incidence of obstetric abnormalities. The only possible explanation for the striking difference is that to-day interference is considered proper where formerly it was not. In 1928 the proportion of Cæsarean sections to total deliveries was as great as the proportion of all obstetric operations to total deliveries 60 years ago; in spite of this craniotomy was performed twice as frequently in 1928 as in the former period. Moreover, the forceps rate is now nearly ten times what it was in 1870, and version (which in the days of Galabin and Braxton Hicks was a relatively common method of delivery in difficult cases) is only slightly less common in the present day practice of Guy's Hospital.

What is the meaning of this change in our methods? It is sometimes explained on the grounds of modern impatience and meddlesomeness. If only the obstetrician, it is sometimes said, would exercise his patience more and his art less, natural delivery would be a much more common event, and natural delivery must be the best thing for the patient. This line of reasoning generally concludes with the aphorism that the best way to reduce the frequency of the tragedies of labour is to leave to Nature what Nature ordained. Such an argument has been used so often, and when applied to indiscriminate interference is so obviously true that we must not be carried away by its extreme application. To say feebly that we are not impatient and meddlesome is an assertion that we cannot expect to be accepted without proof; but, in so far as such a thing is capable of proof, we have some statistical

[1] Report of Guy's Hospital Lying-In Charity, Guy's Hospital Reports, 1876, xxi. (3rd Series), 265.

[2] Clinical Report of Maternity Department, ibid., 1929, lxxix, 277.

evidence in a comparison of the frequency with which the placenta was removed manually. This operation is sometimes, but only rarely, an absolute necessity, and the frequency with which it is performed may be to some extent an index of the impatience and meddlesomeness of the obstetrician, since it is not performed out of consideration for any physical suffering on the part of the patient. In 1870, during a time when interference generally was far less frequent than it is to-day, the placenta was removed manually almost twice as often as it is to-day. This at least suggests that midwifery now is conducted with no less patience than it was 60 years ago.

There can therefore be only one explanation for the increase in obstetric interference, and that is that our standards of what we regard as "tolerable suffering" have changed since Galabin's time. This is a natural consequence of changes in social conditions in the same period. These two changes go hand in hand, and to condemn the one as a curse, while accepting the other as a blessing, is merely a peevish outcry against the inevitable. The increase in obstetric interference has come to stay, just as our improvements in the standard of living have come to stay, and any attempt to tackle the problem of maternal mortality by "back to Nature" methods is doomed to fail at its very inception—doomed by the impossibility of forcing it upon our patients, rather than by any unwillingness on the part of the accoucheur. Even if it could be adopted it still remains to be shown that it would result in any reduction in the mortality-rate. The figures quoted show that in multiplying the frequency of interference by six, we have divided the maternal death-rate by four, but it does not follow that by doubling the present interference rate we should again halve the mortality-rate. We must find the amount of interference that will give the minimum mortality. The general outcry against obstetric interference is certainly justified when that interference is excessive, but we must not expect—indeed we cannot wish—that it should be so seldom resorted to as it was 60 years ago. The solution to the problem of maternal mortality will not come from drastic changes in the accepted modern technique of conducting labour. Indeed, the present technique and the present-day willingness to interfere are the result of true advances in the practice of obstetrics, a response to the demands of women to be relieved of some of the intolerable suffering to which they were submitted three generations ago. With them come, not an increased mortality, but a death-rate reduced to one-quarter of the original figure.

Avoidable Complications.

The part played by antenatal work in reducing the mortality is difficult to assess, but an index of its value can be obtained by comparing, in the two series, the number of deaths which follow complications that can be avoided by efficient antenatal work. The most important are: (*a*) disproportion, (*b*) malpresentation, (*c*) toxæmias of pregnancy, and (*d*) serious intercurrent diseases. The deaths ultimately due to these causes have been set out in Table II.

Disproportion is now responsible for far less deaths than formerly, and this improvement must be due, in part at least, to the fact that antenatal supervision has forewarned us and enabled us to deal more safely with such cases. Part of the improvement is, of course, due to improved technique—for example, the substitution of Cæsarean section for a difficult craniotomy—but even so, Cæsarean section is safe only in so far as it has been foreseen at the antenatal clinic and performed before it has become a dangerous operation late in labour. Malpresentation was ultimately responsible for only about half as many maternal deaths as it was 60 years ago, and here again antenatal care must be held responsible for the improvement. Comparative figures on the toxæmias of pregnancy are notoriously fallacious, since the frequency and severity of eclampsia seems to vary within wide limits in different places, and also possibly in different periods, but in spite of this the reduction in the death-rate from eclampsia in the more recent series is probably significant, and can be taken as still further proof of the value of antenatal work. Apart from fulminating cases, which sometimes occur quite soon after examination has revealed a normal blood pressure and urine, there is no doubt that antenatal care, if efficiently carried out, can greatly reduce the incidence of eclampsia.

Table II.—*Death-rates per 1000 Deliveries in Cases of Disproportion, Malpresentation, Toxæmia, and Intercurrent Disease.*

1863–1875 (23,591 cases).		1919–1928 (21,423 cases).	
Disproportion—		Disproportion—	
Forceps	5	Cæsarean section	3
Version	2	Craniotomy ..	1
Craniotomy ..	6		4 = 0·19 *
Ruptured uterus	5		
	18 = 0·76*		
Malpresentation—		Malpresentation—	
Version	1	Ruptured uterus	1 = 0·046 *
Ruptured uterus	1		
	2 = 0·08*		
Eclampsia	7 = 0·29*	Eclampsia	1
		Other toxæmias ..	2
			3 = 0·14 *
Intercurrent diseases—		Intercurrent diseases—	
Phthisis	1	Phthisis	1
Heart disease ..	5	Heart disease ..	3
Tumour of brain	1	Hyperthyroidism	1
Purpura	1		
	8 = 0·32*		5 = 0·24 *

* Per 1000.

There can be no doubt that the care of the general health during pregnancy forms a very important part of antenatal supervision, and although no very great decrease in the number of deaths from intercurrent disease can be demonstrated in these series, the benefits of antenatal care in this direction are probably far greater than analysis seems to suggest. The fact remains, however, that where pregnancy complicates, or is complicated by, some serious intercurrent disease which of itself is likely to cause death, antenatal care has not been rewarded by any very great decrease in the death-rate.

Sepsis.

The part played in the reduction of maternal mortality by changes in our outlook on sepsis during the last 60 years is well brought out in Table III.

Table III.—*Death-rates per 1000 Deliveries from Sepsis.*

1863–1875 (23,591 cases).		1919–1928 (21,423 cases).	
Sepsis following normal labour	26	Sepsis following normal labour	1 = 0·046*
Sepsis following P.P.H.	6		
	32 = 1·31*		
Sepsis following obstetric operations—		Sepsis following obstetric operations—	
Version, malpresentation ..	3	Cæsarean section	2 = 0·09*
Version, placenta prævia	1		
Forceps	1		
Craniotomy ..	3		
Manual removal of placenta ..	2		
	10 = 0·42*		
Total deaths from sepsis ..	42 = 1·73*		3 = 0·14*

* Per 1000.

In studying the death-rate from sepsis it is important to distinguish between spontaneous deliveries in which sepsis supervened and cases where the infection

followed major obstetric interference. The factors contributing to infection in these two groups are probably different, and an estimate of the efficacy with which the various factors have been dealt during recent years can best be obtained by considering each group separately.

In natural delivery, trauma and perhaps also direct inoculation by the hands of the attendant are probably not the most important factors predisposing to the sepsis. If we try to find some explanation for the fact that the death-rate from sepsis following natural delivery was 30 times as great in the 1863–75 series as in the 1919–28 series, we are tempted to attribute it to more efficient prevention of cross infection in recent years. In the present practice of Guy's Hospital, isolation of "district" cases is comparatively easy, since patients with pyrexia are effectively isolated in their own homes and, if admission to hospital is thought necessary, the patient is taken into the septic ward, which is situated in a block of buildings far removed from the maternity ward. The student who has delivered such a patient is easily suspended from duty if necessary and has not, as a rule, been in contact with more than one or two patients before his case of sepsis has become manifest. Thus, except for these one or two contacts, isolation is efficient even before the first manifestation of sepsis. The danger of cross infection is, however, less easily dealt with among ward cases, but here again it is only very rarely that an infected case—i.e., a patient in whom repeated attempts at delivery have been made outside the hospital—is admitted. Such a patient is potentially infected and is therefore a potential danger to all the other patients in the hospital ward, and the danger is all the more insidious in that she may show no signs of her infection until a day or two after she has mixed with other patients in the ward. At Guy's Hospital the majority of patients who live outside the "district" and who are delivered in the hospital have been looked after during pregnancy by the hospital. Emergencies from outside practitioners are seldom admitted. This limitation of the hospital service is more than compensated for by the relative freedom from serious sepsis in the maternity ward.

The attitude taken towards isolation 60 years ago can be judged from the following extract from Galabin's report of 1876.

> . . . it is satisfactory to record that there is no instance in which contagion seemed to have been communicated by the attendant from one patient to another. It is usual to suspend an extern from his duties for a few days if symptoms occur in any patient attended by him which are thought to indicate any special risk of infection. In the case of the resident obstetric assistants, who are not generally in such close attendance upon the patients, reliance is placed upon antiseptic ablutions and change of clothing. The nearest approach to an epidemic was in November and December, 1874, when there were four deaths from puerperal septicæmia among patients delivered within four weeks. All four, however, were attended by different gentlemen, and no communication whatever could be traced between them.

It is seen that the precautions then, although not so strict as those of to-day, were nevertheless on the same general lines. It is true that nowadays four deaths from septicæmia in four weeks would be regarded as more than an "approach to an epidemic," and the more searching inquiries that would be made to-day would probably have revealed some common contact. But the extract from Galabin's report is quoted to show that he was fully alive to the importance of the principle of isolation, and we must assume that his ideas were as faithfully carried out as are similar (though more stringent) ideas to-day. Thus, while there has been an enormous decrease since 1870 in the number of deaths from sepsis following natural delivery, it is difficult to attribute all this improvement to more efficient isolation of contacts, since the broad principles of isolation were enforced 60 years ago. The influence of trauma and of gross contamination at the time of delivery should not be very different in the two series, since we are dealing only with natural deliveries.

The one factor that is different in the two series is the general condition of the mother. With antenatal care, as a rule, the general health of the average mother is probably far better to-day than it was in Galabin's time. The opportunities that we now have of ensuring proper and sufficient food and adequate general treatment are far greater than in former years. Furthermore, in Galabin's report a delivery is classed as natural so long as it was not effected by version, forceps, or craniotomy, and many cases under this heading must have been exhausted by a labour so prolonged as to leave the patient quite unfit to deal with an infection even of low virulence. It has already been pointed out that the forceps rate is now ten times what it was 60 years ago and, so far from causing an increased death-rate from sepsis, it seems quite likely that this very interference is responsible for the decrease, because it has saved many women from the exhaustion that would have followed a more prolonged labour ending in a "natural" delivery. Increased obstetric interference carried out with proper regard to the principles of asepsis and antisepsis may be regarded as a large factor in the reduction of the septic death-rate in the 1919–28 series.

The relative safety attendant upon present-day obstetric interference is further borne out by reference to the septic deaths in cases where the delivery was not spontaneous. In spite of the increased frequency of interference in the 1919–28 series there was a very great reduction in the deaths in this group. This improvement is partly due to the fact that severe trauma after obstetric operations is far less common to-day than formerly, since difficult craniotomies and high forceps deliveries are avoided wherever possible by the induction of premature labour or by Cæsarean section. The greatest factor, however, in rendering obstetric interference relatively safe must be the changes in operative technique. In the light of the results recorded here it would seem safe to conclude that so long as the facilities for good aseptic and antiseptic technique are available and are fully used, the modern tendency to increase the amount of obstetric interference is not merely justifiable but definitely beneficial.

Antepartum and Postpartum Hæmorrhage.

Modern practice has carried with it practically no decrease in the death-rate from accidental hæmorrhage. In all the fatal cases in the 1919–28 series (Table IV.) the hæmorrhage was of the concealed type. Three of the patients were delivered by Cæsarean section, and in one the condition was treated by plugging the vagina.

TABLE IV.—*Death-rates per 1000 Deliveries in Cases of Antepartum Hæmorrhage.*

—	1863–1875 (23,591 cases).	1919–1928 (21,423 cases).
Accidental hæmorrhage	5 = 0·21 per 1000	4 = 0·19 per 1000
Placenta prævia ..	6 = 0·25 ,,	2 = 0·09 ,,

The relatively large number of deaths from this cause may be taken as an indictment against the method of treatment adopted at Guy's Hospital, and, although no fixed line of treatment can be said to be practised, Cæsarean section has been performed frequently in the more serious cases of concealed accidental hæmorrhage during recent years. This can hardly, however, be held responsible for the unfortunate results, since they were roughly the same in Galabin's series, in which more conservative measures were invariably taken. The difficulty is that the fatal result is frequently due to an associated toxæmia of great severity and often of sudden onset. The modern methods of treating blood loss by transfusion are so effective that it is disappointing to find no improvement where these methods have been employed. The reason is probably that patients with concealed accidental hæmorrhage die nowadays not so much from hæmorrhage (which can be treated

effectively) as from profound toxæmia. This belief is born out by clinical experience and by post-mortem findings.

The death-rate from placenta prævia shows a definite improvement in the recent series. This is partly due to the fact that antenatal supervision has at times enabled us to detect, or at least to suspect, the condition before the patient has been weakened by a serious hæmorrhage, but most of the improvement is probably attributable to our improved methods of combating blood loss.

Postpartum hæmorrhage now very rarely causes death, as is shown in Table V.

TABLE V.—*Death-rate per 1000 Deliveries from Postpartum Hæmorrhage.*

1863–1875 (23,591 cases).

Postpartum hæmorrhage	12	
Syncope after slight hæmorrhage	1	
Inversion of uterus with hæmorrhage ..	1	
Total	14	= 0·59 per 1000

1919–1928 (21,423 cases).

Spontaneous rupture of uterus with hæmorrhage	1	
Inversion of uterus with hæmorrhage ..	1	
Total	2	= 0·09 per 1000

This very striking improvement affords still further evidence of the valuable help given by modern methods of treating hæmorrhage.

CONCLUSIONS.

Two series of cases have been compared with reference to the maternal mortality-rate. The difference between the two series is mainly that the one is an example of midwifery practice 60 years ago, and the other of modern practice. In all other respects the two groups are as nearly as possible identical, and any differences between them are to be attributed to inevitable changes in social conditions. By limiting the cases to patients domiciled in a compact "district," the distortion usually present in "in-patient" figures has been eliminated, and by including all cases who, though domiciled in the "district," were nevertheless delivered in hospital, the distortion usually present in "out-patient" figures has also been avoided. The series can, therefore, be regarded as a fair average sample of the general population, at least among the particular social class exemplified by the residents in the Guy's Hospital "district."

The maternal mortality-rate in the last 60 years has fallen from 4·4 per 1000 to 1·03 per 1000, and this improvement can be traced directly to changes in obstetric methods. These changes in practice have resulted in an increase in the amount of interference, but even so the total interference rate at the present time is less than 9 per cent. It is contended that the increased interference up to this point is justified by the results obtained and that it may be an important factor in diminishing the death-rate by eliminating those cases of profound obstetric exhaustion that must have occurred 60 years ago. It is to our improved aseptic and antiseptic technique that we must attribute the fact that, in spite of the much greater frequency of interference, the danger of subsequent sepsis has been very much reduced. Amongst cases of spontaneous labour the conscientious use of a simple antiseptic technique and strict attention to the principles of isolation have practically abolished sepsis as a cause of death.

Antenatal care has shown its value most dramatically in reducing the death-rate in cases of disproportion and malpresentation, and also in making eclampsia a rare disease. But it has done more than this: it has given us the opportunity to look after the general health of the patient during pregnancy so that she is better able to face the risks of labour and the puerperium.

The use of intravenous saline or gum saline or of blood transfusion has contributed largely to the reduction in the death-rate from postpartum hæmorrhage and placenta prævia, but concealed accidental hæmorrhage accounts for practically as many deaths as it did in former years, and the cause of death in these cases seems to be a profound toxæmia which we cannot treat. In spite of the enormous amount of study that has been spent on the toxæmias of pregnancy since Galabin's time our treatment for this condition, once it has developed (whether in association with accidental hæmorrhage or as eclampsia), is as ineffective as ever it was. Apart from the experience gained from periodical swings of the pendulum from radical to conservative lines of treatment we have nothing of fundamental importance to add to the treatment of 60 years ago. We have succeeded in preventing eclampsia to a great extent, but we must not therefore imagine that we have advanced in our treatment of the condition once it has arisen. Under present conditions of practice an occasional case of fulminating eclampsia or of concealed accidental hæmorrhage will occur in spite of reasonable antenatal care, and it is in the treatment of such cases that modern methods have proved so disappointing. To prevent a disease is certainly better than to treat it, but until we can prevent every case of severe toxæmia there is still a real need for efficient treatment.

The death-rate from intercurrent diseases was 0·32 per 1000 in the 1863–75 series, and 0·24 per 1000 in the 1919–28 series, showing that antenatal care has been unable greatly to benefit the pregnant woman who is already seriously ill with some other disease. This is to be expected, since in these cases we cannot look upon childbearing as anything more than a contributory factor in causing death, and we cannot expect antenatal treatment to cure the primary disease. The close approximation of the figures in the two groups is interesting in view of the question of the reliability of national mortality figures. How far do such figures include deaths from intercurrent disease? It is suggested that 0·3 per 1000 may be taken as a true measure of the deaths from non-obstetrical causes in an average unselected practice, and if this is so it is obvious that these cases become a serious factor only when the total mortality-rate is very low.

Investigations

INTO THE

BLASTOGENIC PRINCIPLE IN FOWL SARCOMA,

AND THEIR SIGNIFICANCE IN THE THEORY OF THE ORIGIN OF MALIGNANT TUMOURS.

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BETWEEN 1926 and 1929 I published a series of papers [1] [2] [3] describing some investigations on Peyton Rous's fowl sarcoma These were undertaken with the support of the German Central Committee for Cancer Research and the Fund in Aid of German Science.* My first investigations were based on the work of Gye and Barnard [4] [5] whose technique I learned in London, and on the assumption of Rous and Murphy [6] that these tumours are caused by a filtrable virus. The Rous fowl sarcoma is now admitted to be a true malignant tumour both morphologically and pathologically. As is well known, it differs from other malignant tumours since it is possible to produce tumours of the same kind in healthy fowls by means of filtrates alone, without the inoculation of cells. A

* I am particularly indebted to Prof. M. Busch of the State Department of Health, who supervised the pathological and anatomical part of the work and prepared microscopic and macroscopic sections.

single injection of 1·0 c.cm. of a sterile and cell-free Berkefeld filtrate into the pectoral muscle of a healthy fowl produces tumours which appear microscopically to be true tumours; they infiltrate the healthy tissue without causing any great inflammatory reaction, and give rise to typical metastases in other organs, such as the lungs, liver, and heart.

The fact that the filtrate now and again contains a cell has recently been made by Teutschländer, Nakahara, and other authors[8 9] a reason for believing that the tumours might be caused by isolated cells or parts of cells injected with the filtrate. I have succeeded, however, in proving that tumours can be evoked by the injection of counted cell suspensions containing a relatively large number of cells, but not by suspensions containing a small number. When a suspension containing only a few cells (for example 4000–10,000) is injected into the breast of a fowl on both sides, on one side by itself and on the other with an unheated cell-free filtrate or one that has been heated to 50° C. for a quarter of an hour, a tumour appears only on the side on which the filtrate was injected. The same result followed the injection of the filtrate without the suspension. This proves that the tumour could not have been produced by isolated cells in the filtrate.

I arrived at the same conclusion as a result of some experiments which I undertook to see whether tumours could be produced by injecting the blood, spleen, and egg-yolk of tumour-bearing birds, in many of which there was no histological evidence of metastasis in the organ from which the injected substance was taken, or indeed in any part of the body. My findings agree with those of Rous and Murphy, Bürger, Busch, Pentimalli,[10] Llambias and Brachetto Brian.

I have also investigated the question of whether or not Gye and Barnard are right in assuming that the cause of the Rous sarcoma is an unspecific "virus," together with a chemical "specific factor." The results which I obtained agree with those of Harkins, Schamberg, Kollmer, Kast, Flu, Sternberg, and others, and show that the "specific factor," a chloroform-killed filtrate, is alone responsible. The various attempts which have been made to cultivate the virus, with all kinds of aerobic and anaerobic cultures, have been uniformly unsuccessful. Nevertheless, a Rous tumour has twice been produced with suspensions cultivated in bouillon at 37° C. and then rapidly centrifuged, even in weak dilution. This dilution contained some ordinary Gram-positive rod-shaped organisms which I believe to have adsorbed the activating principle of the tumour into their outer surfaces. Fujinami and Inamoto report a similar observation in which the organisms were staphylococci, and which is especially interesting in view of the occasional success of Blumenthal and his colleagues in cultivating tumour-activating microbes from human cancers.

Chemical Experiments.

After my failure to cultivate the virus I turned my attention more along chemical lines. It is possible by precipitating the euglobulin with carbon dioxide to divide the diluted filtrate into two fractions. By analogy with complement-splitting, I describe the one as the euglobulin fraction, and the other, less accurately, as the albumin fraction. I obtained four positive results with the globulin fractions of various filtrates, and only two with the albumin. Baker and McIntosh, Harde,[11] Sugiura,[12] and Benedict have also worked along these lines, have established that the pH value of the agent never rises above 10·0 nor falls below 3·8, that acid filtrates are less effective than alkaline, and that the time taken by a filtrate to act depends upon the quantity of the agent present. Trypsin stimulated growth (Baker and McIntosh), a fact which suggests that fermentative processes underlie the generation of Rous sarcoma. Sugiura and Benedict, who precipitated the globulin with ammonium sulphate, could produce tumours only with the globulin fraction, and found practically all the nitrogen content of the filtrate in the precipitated globulin. In conformity with Teutschlander and the other workers quoted, we found that 50°–52° C. was the critical temperature for the efficiency of the filtrate, and also that the time factor and the efficacy of the injected substance depended very largely upon its quantity. I therefore proceeded systematically to investigate the fermentative nature and chemicophysical properties of the "agent," and to test for it and demonstrate its existence by the current methods. The carbon dioxide introduced to precipitate the globulin had already been proved innocuous, and it was now demonstrated that a tumour could be produced after chlorine had been passed through the filtrate. Seven filtrates through which hydrogen had been passed and eight through which oxygen had been passed yielded three and one positive results respectively on inoculation. The fact that it was more effective under anaerobic than aerobic conditions showed in this respect a close analogy to Warburg's anaerobic glycolysis.

I then attempted to isolate the agent by adsorption, the possibility of which had been suggested by my own experiments in the transmission of bacteria, by those of Pentimalli on the transmission of healthy embryonic cells, and by those of Carrell on normal macrophages. I therefore tried to isolate the ferment by Willstätter's well-known method, using variously charged adsorbents. In these experiments I was admirably assisted by Dr. Ernst Mislowitzer, of the Chemical Branch of the Pathological Institute, who placed his great experience in this field unreservedly at my disposal. Acting on his advice, we chose casein as the mildest of all the adsorbents. Adsorption was demonstrated by inoculation tests in six out of thirteen filtrates. On animal charcoal it occurred twice in five attempts, and on infusorial earth and kaolin three times out of five. Since the work was completed we have learnt that Lewis and Andervont[14] in America and Sebastiano[15] in Turin have also reported on adsorption experiments with organic and inorganic adsorbents. These authors attempt to explain their findings from the bacteriological aspect by drawing an analogy with the adsorption of various kinds of true filtrable virus. Believing, however, that the agent is like a ferment, we followed Willstätter's method and tried to isolate the blastogenic principle by washing it out of the adsorbent with phosphates on aluminium hydroxide, succeeding in six attempts out of ten.

It appeared to me that in order to form a correct opinion of the nature of the agent, it was necessary to estimate its size. The adsorption experiments had shown that a filtrate was often rendered ineffective by filtration through candles on account of adsorption; I therefore used gauged de Haen filters, membrane filters and "ultrafilters" (Bechhold's collodion filter). In these experiments the agent passed twice out of eight times through a medium membrane filter gauged to pass bacteria, and once out of seven times through a fine one. The inoculation test was positive, however, even after filtration, both through a rapid and a medium ultrafilter, the times being one to five and ten to fifty minutes respectively. The medium ultrafilter holds back benzopurpurin, but passes albumin; and the largest pores will let through particles of about 10 $\mu\mu$ diameter. Finer filters, such as the fine ultrafilter with a time of 100–500 minutes, and the finest ultrafilter have, however, not yet passed the blastogenic principle, so that its size must be about that of the albumin molecule. These filtration tests indicate that it is less likely to be a living virus than a chemical substance. Their results therefore confirm and amplify those of the adsorption and "elution" experiments.

Discussion.

There remains to be considered the application of these results to tumour research as a whole. The Rous fowl sarcoma is the only malignant tumour yet discovered that can be transmitted with certainty by means of cell-free filtrates. It is probable, however,

that a number of other mammalian tumours are capable of cell-free transmission. Blumenthal and his colleagues have succeeded in producing tumours in normal animals by injecting the spleen or blood of tumour-bearing rats and mice, and similar results have been achieved by Rhoda Erdmann with filtrates of Jensen's rat tumour. Kritchewski produced a tumour in a rat by injecting substance from a human melanotic sarcoma, and transmitted the tumour by means of sand filtrates and cystic fluid containing blood. None of these results, however, can yet be reproduced with anything like the same certainty and regularity as the cell-free transmission of Rous's fowl sarcoma, which is the only tumour of which the active principle can yet be separated with certainty from the cells. Most of the authorities who have worked with Rous's sarcoma have abandoned the view that the agent is a living virus. The belief in a virus which can lead of its own accord to the growth of a specific malignant tumour when introduced once into the body runs counter to the experience of all clinical and pathological research on tumours. On the contrary, clinical experience of tumours proves with certainty that they can be initiated in the human body by the following stimuli:—

1. Thermal—e.g., cancer of the abdominal skin caused by the "kangri."

2. Physical—e.g., cancer of the skin after X ray and radium applications.

3. Mechanical—e.g., traumatic sarcoma.

4. Chemical—e.g., aniline and paraffin cancer and the pulmonary lympho-sarcoma of the Schneeberg cobalt miners.

5. Parasitic—e.g., cancer of the bladder, due to bilharziasis; cancer of the tongue following syphilitic leucoplakia; and probably cancer of the gall-bladder and ducts in chronic streptococcal infection and cholelithiasis.

Experimental and animal pathology have also provided numerous examples of these various possible causes of malignant tumours. Briefly, a few of the best known are the spiropteric cancer of the stomach in rats, discovered by Fibiger; carcinoma following "kalkbein" of fowls; the production by Yamagiwa and his colleagues of carcinoma in mice by painting with tar over long periods, and the production of cancer in rats and in the ears of rabbits, and on fowls by Choldin; tumours produced with scarlet red by B. Fischer—and the results of inoculation or cell culture, combined with applications of tar and arsenious acid, reported by Carrell and Albert Fischer.

All these examples prove that malignant tumours can be evoked by the most varied causes. It is surely a mere complication to assume the existence of a second exogenous factor, such as a living virus, in addition to all this host of other causes. What we do not know, however, is the nature of the internal process which makes the malignant tumour grow in normal tissue or out of it. If we have succeeded in making it probable that the blastogenic principle isolated from the tumours of fowl sarcoma is not a living virus but a chemical agent or a ferment, it becomes possible to find a place for these tumours in the general theoretical fabric of neoplasmology. Up to the present, this is the only tumour in which the blastogenic principle has indubitably been isolated from the cells. Further research will doubtless be directed towards confirming these results and ascertaining whether they hold good for other malignant tumours. If, by the use of these or other methods, we can discover the nature of the chemicals or ferments which can be isolated from the growths and which stimulate the cells to tumour formation, we may find out that principle of the cause and development of tumours which underlies all the multifarious exciting factors.

Summary.

The tumour-producing agent ("blastogenic principle") of Rous fowl sarcoma filtrates can be separated from the tumour cells and isolated by the usual methods of ferment isolation.

A chemical or ferment theory of the "blastogenic principle" harmonises better with the facts of clinical and experimental investigation than does the hypothesis of a living virus.

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DIAGNOSTIC VALUE OF THE ESTIMATION OF BLOOD CHOLESTEROL IN CHOLELITHIASIS.

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THIS investigation was undertaken to assess the diagnostic value of an estimation of the amount of cholesterol in the blood in cases of supposed cholelithiasis. Before investigating patients known to be suffering from this condition it is obviously essential to decide what can be considered as normal, and to define the limits of the normal, especially as there is considerable variation in the figures given by different authorities both for the mean value and the range of value.

In selecting a method for determining the amount of cholesterol one was chosen in which the quantity of blood withdrawn from the patient was large enough to ensure accuracy, but not so large that one or more withdrawals might impair the general condition, and was, comparatively speaking, easily and quickly carried out. The method was that advocated by Myers in his book,[1] and described originally in papers by Gorham and Myers,[2] and Myers and Wardell.[3] It had the disadvantage of being colorimetric and, therefore, open to an inevitable margin of error.

The estimation is carried out after obtaining the Liebermann-Burchard reaction for cholesterol in the fluid to be estimated. The only absolute method of estimating cholesterol is the gravimetric method of Windaus, after precipitation of the cholesterol in combination with digitonin. It is costly and tedious, and requires larger quantities of blood than are practicable in clinical work. Colorimetric estimation of cholesterol after obtaining the Salkowski reaction has no advantage over the other colorimetric method. For Myers' method 1 c.cm. of blood or serum is required, and a calculation is made to determine the number of grammes of cholesterol per 100 c.cm.

The figures for normal subjects given by various workers using different methods are as follows:—

Autenreith and Funk,[4] in a classical paper upon which much subsequent work has been based, give a normal range in whole blood of 0·140–0·160. They estimate against a

standard green colour in an Autenreith comparator after obtaining the Liebermann reaction in the unknown. They hint that, as the method is a colorimetric one, it can only be considered accurate to the second place of decimals. Henes,[5] using a very similar method, gives for serum a range of 0·110–0·182 with an average of 0·148. Grigaud,[6] estimating four normals, gives for whole blood 0·150–0·165 and for plasma 0·168–0·175, and Chauffard, Laroche, and Grigaud[7] for whole blood 0·150–0·180. Bacmeister and Havers[8] give for whole blood 0·110–0·180. Bloor,[9] using a special method of extraction, gives values for whole blood of 0·190–0·260, and for plasma of 0·170–0·240. Most other workers regard these figures as definitely too high. Gorham and Myers,[3] extracting dried blood, found a range of 0·130–0·190, with an average for 14 cases of 0·150. All these workers were using the Liebermann colour reaction. Weston and Kent,[10] using the Salkowski reaction, give a range of 0·117–0·297, with an average for 52 subjects of 0·182. Gardner,[11] using the digitonin method, gives for serum an average of 0·169 in 43 subjects.

TABLE I.

Age.	Sex.	Blood. Samples.	Highest.	Lowest.	Difference.	Mean value.	Plasma. Samples.	Highest.	Lowest.	Difference.	Mean value.	Remarks.
58	M.	4	0·120	0·116	0·004	0·119	—	—	—	—	—	Urethral stricture.
40	M.	2	0·178	0·174	0·004	0·176	—	—	—	—	—	Inguinal hernia.
25	M.	2	0·156	0·154	0·002	0·155	2	0·133	0·131	0·002	0·132	,, ,,
21	M.	2	0·102	0·098	0·004	0·100	2	0·092	0·090	0·002	0·091	Torn semilunar cartilage.
51	M.	2	0·169	0·163	0·006	0·166	2	0·146	0·138	0·008	0·142	Urethral stricture.
18	M.	2	0·206	0·200	0·006	0·203	2	0·184	0·179	0·005	0·182	Hydrocele.
32	M.	2	0·150	0·149	0·001	0·150	2	0·153	0·151	0·002	0·152	Torn semilunar cartilage.
56	F.	2	0·146	0·144	0·002	0·142	—	—	—	—	—	Carcinoma of liver.
50	M.	—	—	—	—	—	2	0·143	0·139	0·004	0·141	Inguinal hernia.
		Average				0·151	.. ..				0·142	—

In determining the values for blood or plasma three or four estimations were carried out on each specimen, necessitating the withdrawal of from 3 to 6 c.cm of blood. Considerable discrepancies were found, and certain modifications were introduced into the method. Similar unsatisfactory results obtained by Myers's method have been recorded by Ling.[12] The stages of the method were investigated and the following conclusions reached. It appeared to be immaterial whether the mixing of the blood or serum with plaster-of-Paris was carried out roughly with a glass rod or intimately in a pestle and mortar. After extraction for half an hour, it was still possible in many cases by further extraction to find remaining cholesterol capable of estimation, and it was found necessary to extract for one and a half hours.

The amounts of reacting substances were doubled, but the proportions kept unchanged. As there was considerable evolution of heat during the reaction, the mixture was stirred with a glass rod first until the vigour of the reaction had subsided, and then further mixed by inversion.

Determination was carried out in a colorimeter having cups with fused glass bottoms. This is essential, as the acid chloroform mixture destroys the cement used in the ordinary type of cup. For each estimation ten readings were taken.

In this manner an appreciable time was taken over one determination, and it was found that the intensity of the colour was increasing progressively. Investigation was made, therefore, on the rate of development of the intensity of colour in a standard solution of pure cholesterol after addition of acetic anhydride and pure sulphuric acid compared against a stable standard solution of naphthol green. It was found that it takes 45 minutes for the maximum intensity to develop.

This is a very important point, and one to which insufficient attention has been directed. Myers advises reading after ten minutes, but it is of interest to note that Grigaud[13] states that half an hour is the ideal time, while Autenreith and Funk advise 20 minutes.[4] The rate of development shows no variation within the ordinary range of room temperature, and this accords with the findings of the rate of development of the Salkowski reaction as recorded by Weston and Kent.[10] Bright sunlight should be avoided, but it is unnecessary to keep the reagents in the dark.

In subsequent work a standard solution of cholesterol was always used, as solutions of naphthol green have a yellow-green tinge, as opposed to the blue-green of the Liebermann reaction, and make matching of the colour very difficult. The reaction given by pure

TABLE II.

Age.	Sex.	Blood. Samples.	Highest.	Lowest.	Difference.	Mean value.	Plasma. Samples.	Highest.	Lowest.	Difference.	Mean value.
72	F.	—	—	—	—	—	2	0·285	0·275	0·01	0·280
56	F.	—	—	—	—	—	2	0·216	0·210	0·006	0·213
43	F.	—	—	—	—	—	2	0·306	0·305	0·001	0·306
45	F.	—	—	—	—	—	2	0·145	0·144	0·001	0·145
50	M.	—	—	—	—	—	2	0·210	0·205	0·005	0·207
45	F.	3	0·143	0·139	0·004	0·141	2	0·152	0·143	0·009	0·148
50	F.	2	0·216	0·210	0·006	0·214	2	0·225	0·217	0·008	0·221
42	F.	2	0·107	0·106	0·001	0·106	2	0·130	0·126	0·004	0·128
49	F.	2	0·213	0·205	0·008	0·210	2	0·200	0·191	0·009	0·194
53	F.	4	0·129	0·126	0·003	0·128	—	—	—	—	—
48	M.	2	0·215	0·205	0·01	0·210	—	—	—	—	—
50	M.	2	0·283	0·273	0·01	0·278	—	—	—	—	—
44	F.	2	0·162	0·156	0·006	0·159	—	—	—	—	—
57	F.	2	0·168	0·165	0·003	0·166	—	—	—	—	—
		Average				0·179	.. ..				0·204

cholesterol is always bluer than that given by specimens of blood or plasma, indicating that the two substances are not identical. This has been noted by other workers, Bloor[9] and Autenreith and Funk[4] supposing it to be due to overheating during extraction. Mueller[14] has shown that the colorimetric methods always yield higher figures than the gravimetric, indicating that they estimate derivatives of cholesterol as well as pure cholesterol and its esters. Strictly comparable readings were obtained both by daylight and by artificial illumination, but daylight was preferable as less fatiguing.

The Technique.

The method which was used therefore was as follows:—

One c.cm. of whole blood or plasma was measured from a pipette on to about 5 g. of plaster-of-Paris contained in a small evaporating basin, mixed by stirring and pounding with a glass rod, and dried in a hot-air oven for an hour. The dried mixture was then transferred to an extraction thimble about 5 cm. long, contained in a perforated glass tube fixed in the upper part of a 150 c.cm. flask containing about 20 c.cm. of chloroform at the bottom, and glass beads to prevent bumping. Extraction was then carried out under a double-surface reflux condenser on an electric sand-bath at constant temperature for one and a half hours. At the end of this time the extract was made up to 15 c.cm. at 15°. Ten c.cm. of this were taken, and 4 c.cm. of acetic anhydride and 2 c.cm. of pure sulphuric acid added. The mixture was stirred with a glass rod and inverted several times, the tube being closed by a rubber stopper and allowed to stand on the bench out of direct sunlight. Comparisons were made with 10 c.cm. of a standard solution of pure cholesterol similarly treated after standing for 45 minutes. Readings were then taken.

In all cases, two or even four estimations were carried out simultaneously on any given sample of blood or plasma. These can be carried out quite easily by using a battery of four double-surface condensers over an electric sand-bath. By this method the error should not exceed 2·5 per cent. As the method is a colorimetric one, some error is inevitable, and caution is therefore necessary before attaching importance to small variations in the estimated cholesterol value. Further, it is desirable for accurate work to estimate more than one specimen from any given case. The majority of estimations were made on whole blood, to correlate them with results obtained in experimental animals, in which it is impracticable to work with plasma owing to the small volume of the total blood in the animal. This is open to criticism in that it is well established that the cholesterol of the corpuscles is mostly free, while in the plasma more esters are present. Henes,[5] however, has pointed out that relative changes in the whole blood or plasma appear strictly comparable.

The method of estimation described gives the value for free cholesterol plus cholesterol esters. In Table I. figures obtained from blood or plasma in nine normal individuals are recorded, with the amount of variation in and the number of estimations of identical specimens. The average value was 0·151 for whole blood and 0·142 for plasma. This agrees with figures given by other workers, but the range 0·100–0·203 is considerably greater than that given by most, though Weston and Kent,[10] in their series of 52 normals, record a range of 0·117–0·297.

Variations with Diet.

The next point was to determine whether for any given individual the cholesterol value was comparatively stable on an ordinary mixed diet. Specimens were obtained from two normal individuals at various times in the day without any reference to the time after the last meal, and showed remarkable constancy. In the first case, a man aged 31, estimations on the first day gave a value of 0·150 for whole blood. Estimations were again carried out on the nineteenth and two following days, and on each occasion the value was 0·150. The second individual, a man of 68, gave values in whole blood on three successive days of 0·119, 0·118, and 0·122. This demonstrates a remarkable constancy for any given individual. Rothschild[15] and Luden[16] have obtained similar results in experimental animals, and I have found it true in the cat.

The figures obtained from individuals suffering from cholelithiasis uncomplicated by jaundice often show low values, although the average is higher, and therefore the diagnostic assistance of the estimation is negligible. It is but fair to point out that some workers explain these low values as due to coexistent sepsis, but on comparing the chemical and clinical findings there appeared no close relationship between the two. The figures obtained are shown in Table II. It is of interest to note that there appears some indication of a reversal of the relationship between the whole blood and the plasma cholesterol.

TABLE III.

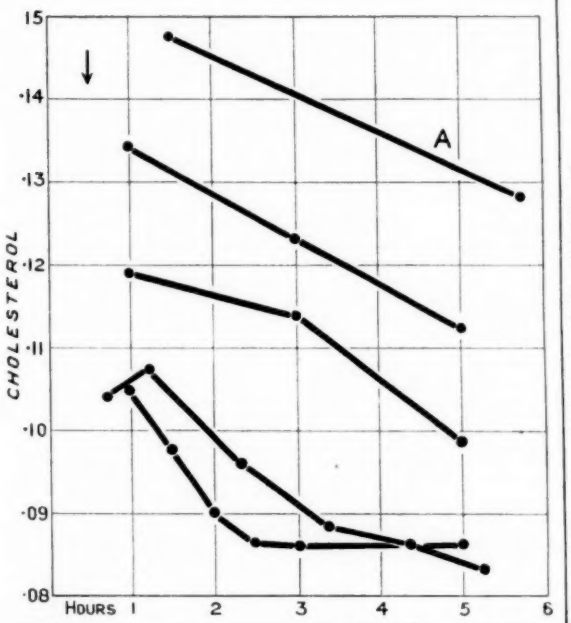
Age.	Sex.	Blood.					Plasma.					—	Duration.	Blood.	Plasma.
		Samples.	Highest.	Lowest.	Difference.	Mean value.	Samples.	Highest.	Lowest.	Difference.	Mean value.				
25	M.	2	0·156	0·154	0·002	0·155	2	0·133	0·131	0·002	0·132	Inguinal hernia.	45°	—0·045	—0·038
18	M.	2	0·111	0·109	0·002	0·110	2	0·095	0·093	0·002	0·094				
		2	0·206	0·200	0·006	0·204	2	0·184	0·179	0·005	0·182	Hydrocele.	45°	—0·031	—0·052
21	M.	2	0·174	0·171	0·003	0·173	2	0·132	0·128	0·004	0·130				
		2	0·102	0·098	0·004	0·100	2	0·092	0·090	0·002	0·091	Semilunar cartilage.	45°	+0·017	+0·005
45	F.	2	0·121	0·115	0·006	0·117	2	0·097	0·096	0·001	0·096				
		3	0·143	0·139	0·004	0·141	2	0·152	0·143	0·009	0·148	Gall-stones.	120°	+0·001	—0·008
50	F.	2	0·146	0·136	0·010	0·142	2	0·142	0·137	0·005	0·140				
		2	0·216	0·210	0·006	0·214	2	0·215	0·210	0·005	0·213	Gall-stones.	80°	—0·073	—0·116
47	F.	2	0·141	0·140	0·001	0·141	2	0·098	0·096	0·002	0·097				
		2	0·213	0·205	0·008	0·210	2	0·200	0·191	0·009	0·195	Gall-stones.	75°	—0·025	—0·001
		2	0·186	0·184	0·002	0·185	2	0·197	0·191	0·006	0·194				

One estimation either of the whole blood or plasma cholesterol is of no assistance in diagnosis. Gorham and Myers[2] found the values quite inconstant, but Henes[17] claims to be able to base a diagnosis on this information. High values could only be obtained with certainty in cases of severe obstructive jaundice; the milder types of catarrhal jaundice gave normal figures. Thus in three cases of carcinoma of the pancreas with severe jaundice the values in whole blood were 0·375, 0·334, and 0·225, while in three cases of catarrhal jaundice the figures were 0·187, 0·155, and 0·143. This agrees with the findings of Rothschild and Rosenthal,[18] who found in 37 cases of cholelithiasis values of 0·132–0·425, the high values being found in cases complicated by jaundice, and of Rothschild and Felsen,[19] who describe the height as roughly proportional to the jaundice. It is interesting to note that these high values drop rapidly after relief of the jaundice by drainage. Thus the case giving a value of 0·375 before drainage fell to 0·237 in ten days, and one giving 0·334 before operation to 0·160 in 15 days. Rothschild and Rosenthal[18] have obtained similar results, and Campbell[23] corroborates them.

The Effect of Anæsthetics.

As it appeared that the fall might be due to or influenced by the anæsthetic used at the operation, the effects of general anæsthesia on the blood cholesterol were investigated. There is little in the literature on this. Rothschild and Wilensky[20] assume that a

fall occurs, whilst Mahler,[19] using Leiboff's[22] modification of Myers' method, found that there was a constant rise with ether anæsthesia of an hour's duration. It must be pointed out, however, that this method consists of one estimation on 0·25 c.cm. of blood, and the increases recorded are small. In Table III. are shown figures for whole blood and plasma in cases subjected to ether anæsthesia for periods varying from 45 to 120 minutes. The changes



Blood cholesterol in cats under ether anæsthesia. Anæsthetic started at point indicated by arrow.

appear to be definitely in the direction of a fall, in one case well marked.

This point was further investigated in cats over long periods of ether anæsthesia. The blood cholesterol value in the cat is 0·100–0·150, and appears, in contrast to the human subject, to vary with the size of the animal. The specimens of blood were obtained from the femoral vein. The results are shown in the Figure. Part of this fall in the cat might be explained by dilution of the blood with cholesterol-poor fluid to maintain the blood volume against the repeated withdrawal of relatively large quantities (3–6 c.cm.) of blood, the total blood volume of the cat being about 140 c.cm. That it is not entirely due to this is shown by the experiment marked A, made on two estimations only, one taken one hour, and the second five and a half hours after the commencement of anæsthesia. In no case was a fall produced by anæsthesia sufficient to explain that found after the relief and drainage of a case of obstructive jaundice.

Summary.

1. A modification in the technique for estimating the amount of cholesterol in the blood is described. 2. The normal range of value is shown to be greater than is usually realised. 3. Although the average value is raised in subjects suffering from cholelithiasis, estimation on an individual case is useless as a means of diagnosis. 4. The whole blood cholesterol is very markedly raised in the severer degrees of obstructive jaundice, the rise disappearing when the jaundice is relieved by biliary drainage. 5. Ether anæsthesia tends to produce a fall in the blood cholesterol, but this can be responsible for only a small part of the fall after biliary drainage. 6. The blood cholesterol tends to maintain a constant level in any normal human subject.

This work was carried out during my tenure of a research scholarship at St. Thomas's Medical School, and I am indebted to my colleagues for access to cases under their charge.

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THE CAUSATION AND TREATMENT OF DISPLACED MANDIBULAR CARTILAGE.

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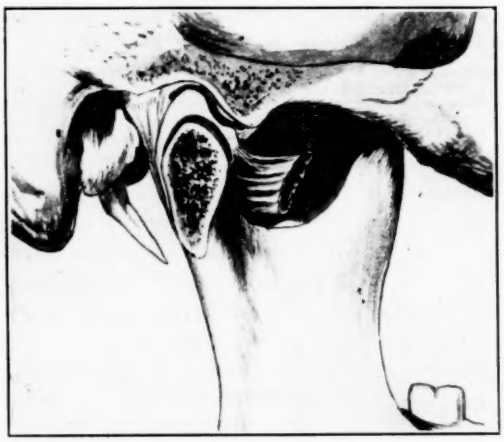
THE temporo-mandibular joint, although a somewhat complex structure, is nevertheless very stable and dislocation of the joint itself or of its meniscus or fibrocartilage is uncommon.

Displacement of the mandibular cartilage is a rare accident and this is probably due mainly to the shape and attachments of this meniscus. The fibrocartilage is a dome-like structure very closely applied to the convexity of the mandibular condyle. As far as thickness is concerned it is irregular, being very much thicker in its centre and anteriorly (see Fig. 1); between these two thickenings there is a distinct depression. The posterior part of the cartilage is very thin and passes well down over the posterior surface of the condyle and fuses behind with the capsule. I have examined over 50 specimens of the mandibular fibrocartilage in the anatomical department at King's College and in the post-mortem department at King's College Hospital and all conform to the description I have given. This description is, however, at variance with the descriptions given in the current standard text-books of anatomy, the most common description being that the interarticular fibrocartilage is an oval plate thinnest at the centre, where it is occasionally perforated, and thickest posteriorly. I have never seen a perforated interarticular fibrocartilage in this joint in either young or old subjects. The anatomical description to which most of the text-books conform must have been handed down for generations and nobody has troubled to investigate the matter and verify the commonly accepted description. Most text-books of anatomy contain quite good sectional diagrams of this joint which, to the most casual reader, are obviously at variance with the text description.

The temporo-mandibular joint is divided by the fibrocartilaginous disc into two cavities, each provided

with a distinct synovial membrane. The circumference of the disc is adherent to the capsular ligament and anteriorly affords partial insertion to the external pterygoid muscle. It is owing to the fact that there are two definite cavities in this joint that movements of two different kinds can take place. These movements are somewhat complex. Gliding movements whereby the interarticular disc and the condyle move together as one on the temporal bone take place in the upper synovial cavity. Further, a rotation between the disc and the condyle occurs in the lower

FIG. 1.



Section of right temporo-mandibular joint showing shape and relations of the meniscus.

synovial cavity. Probably these two movements rarely occur independently of one another.

The somewhat frequent displacement of the medial meniscus of the knee-joint is due to the fact that the cartilage is placed at the periphery of a very shallow concavity, and also to the fact that the internal lateral ligament of the knee-joint is adherent to it. The latter fact is important, since whenever this ligament is put on the stretch it tends to pull the meniscus beyond the limits of the joint. Displacement of the internal meniscus of the knee-joint is the result of some sudden movement of the joint; similarly, displacement of the mandibular meniscus is due to some sudden or irregular contraction of the external pterygoid muscle. Unlike the medial meniscus of the knee-joint, which may be torn or ruptured, the mandibular cartilage always remains intact. Displacement of the cartilage may be caused by a violent cough, sneeze, or yawn, the external pterygoid muscle contracting during the rapid closing of the mouth and drawing the cartilaginous disc obliquely forwards and inwards. Occasionally displacement may result from a blow on the jaw when the mouth is open, the trauma not being of sufficient force as to cause dislocation of the condyle over the eminentia articularis of the temporal bone. Again, displacement occurred in one of my patients as the result of extraction of one of the lower molar teeth.

The posterior thinned-out part of the meniscus becomes detached from the capsule and this permits it to be drawn forwards and inwards by the external pterygoid muscle, and as the mouth closes by elevation of the jaw the disc of cartilage becomes severely crushed between the condyle and the temporal bone.

The symptoms caused by such a displacement are very characteristic. The patient experiences sudden acute pain in the joint which may be referred to the pinna or the skin above the pinna. This referred pain is due to the fact that the auriculo-temporal nerve not only supplies the joint but also gives off sensory branches which supply the upper part of the pinna and the skin above it. All attempts to close the mouth are painful and the patient will sometimes volunteer the remark "there is something sticking in front of my jaw which prevents my shutting my mouth." Excessive salivation is often a marked feature, but in old-standing cases or in those in which the meniscus is very mobile owing to repeated displacement it is often so slight as not to cause the patient any annoyance. Mastication is attended with considerable difficulty, as slight chewing causes acute pain. This, however, becomes less marked in a day or so, probably due to the fact that a definite synovitis is set up when the primary displacement takes place. This synovitis causes the capsule of the joint to become very tense, and this in itself will account for the pain felt when movement occurs in the joint. When the synovitis becomes chronic the pain becomes much less marked and greater mobility of the meniscus becomes possible. Quite often the patient suffers from continual recurring displacement which cannot be regarded as acutely painful, but is very distressing since the meniscus slips in and out of position and causes a definite audible snap. In a few cases I have seen this snap has been a source of great annoyance to the patient especially at meal times, the patient being afraid to eat in public for fear of attracting attention.

As regards treatment reduction is much more likely to succeed and be permanent if it is performed on the occasion when the meniscus is first displaced. In old-standing cases the effect of reduction is temporary only. The best method of reduction is to keep up continual pressure behind the condyle of the jaw while the mouth is open. By this means the convex upper part of the condyle will be insinuated into the concave lower surface of the meniscus. After a few minutes of this continued pressure the mouth is closed by slowly elevating the jaw. Sometimes the meniscus slips back with an audible click while in others nothing is noticed at all, but the patient states that the obstruction in the joint has disappeared. Several attempts at reduction are often necessary before reduction is complete.

In cases where displacement is more or less continuous the same changes take place in this joint as occur in the larger joints—e.g., the knee when recurrent displacement of the medial meniscus takes place. The periarticular tissues, capsule, ligaments, and muscles become repeatedly stretched and eventually become relaxed; this allows the meniscus to be displaced whenever the mouth is widely opened. In these chronic cases no treatment with the exception of excision is of any avail. Fortunately, most of these patients are quite content to put up with the slight pain and the inconvenience caused by the repeated "snapping" of the meniscus. Occasionally, however, one meets with a patient who implores the surgeon to give relief from the chronic pain and the continual "snapping" which is described as unbearable. One of my patients was actually contemplating suicide unless relief from the noise could be obtained. She explained that she was forced to take her meals by herself as her husband objected to "the noise she made when she was eating."

Illustrative Cases.

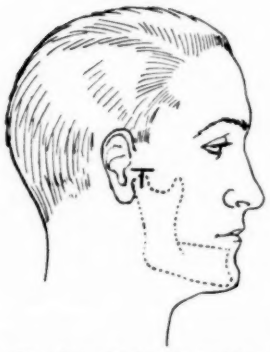
Out of eight patients who have come to me for treatment with recurrent displacement of the mandibular meniscus operation was considered necessary in two only. The reports of the cases are as follows:—

CASE 1.—Mrs. A., aged 31, came under observation in 1922 complaining of pain and a loud clicking noise in the right temporo-mandibular joint. The pain was first noticed two years previously; it came on suddenly after a violent fit of coughing, and for a week at least the patient was unable to close her mouth properly. As the pain became less marked she felt as if some foreign body was in the joint, and whever she opened her mouth at all widely she heard a definite click. The click was then noticed at meal times and became more audible not only to the patient but also to her husband. When she came up to hospital she was in a very depressed condition, had lost two stone in weight

during the previous year, and implored for relief from the constant clicking noise which she said was driving her mad. Local treatment in the shape of diathermy to the side of the face over the joint was given for ten days, but without relief.

Operation was performed in June, 1922, and the joint was explored through a T-shaped incision (Fig. 2). The capsule was opened and the cartilage was found to be extremely loose and attached in front only, having no connexion whatever behind. The cartilage could be moved in any direction even when the jaw was depressed as far as possible. Notwithstanding the two years' history, there was no sign of osteo-arthritis in the joint. The cartilage was drawn out of the joint, and its anterior attachment to the capsule and external pterygoid muscle having been severed, it was removed. The opening in the capsule was closed by three interrupted catgut sutures. The skin was approximated by three silkworm gut sutures.

FIG. 2.



Showing T-shaped incision used in exposing the joint.

For the first 12 hours after the operation the mouth was kept closed by means of a four-tail bandage. After this an elastic strap was applied which allowed the mouth to be opened slightly. At the end of a week when the stitches were removed a small collodion dressing was applied and no bandage. The patient had no pain after the operation, even during mastication. She was discharged nine days after the operation. When seen again three months later she was very pleased with her condition. She had experienced no pain whatever. The scar was very slightly visible and was easily covered by her hair. Movements of the jaw were normal.

CASE 2.—Miss E., aged 25, a school-mistress, came under observation in May, 1926, complaining of pain and a loud crackling noise in her right temporo-mandibular joint. She stated that the trouble commenced three years ago and was caused by the extraction of her lower wisdom tooth. The tooth, which probably was erupting abnormally, was extracted under general anæsthesia. Her face became very swollen the day after the extraction and she could not close her mouth. Three weeks at least elapsed before the swelling completely disappeared and then the patient noticed that she could not bite her food with her front teeth without suffering pain. The pain, however, gradually disappeared but she became conscious of something inside the joint of her jaw. Soon after this the patient noticed a definite clicking sound whenever she opened her mouth, and especially on mastication. The click became more marked and was audible not only to the patient but also to her friends. She sought advice at hospitals and even went to a bone setter who gave her three treatments without avail. The treatment she received from the bone-setter seemed to consist of repeated sharp blows with a sandbag to the nape of the neck, but even this treatment did not prevent the constant clicking sound whenever she ate or opened her mouth at all widely.

In view of the long history in this case, operation was advised. The joint was explored through a T-shaped incision and a very mobile meniscus, which was simply anchored anteriorly, was easily removed. Recovery was uneventful and when seen last in December, 1928, some two and a half years after her operation, she was perfectly happy. There was no pain on mastication or on forcible movements of the jaw, and the audible click had disappeared.

THE QUEEN'S HOSPITAL, SIDCUP.—This great hospital is to be closed next month, the 80 remaining patients being removed either to the Roehampton Hospital or the Highbury Hospital, Birmingham. The institution, which has more than 500 beds, was opened in August, 1917, and nearly 19,000 patients have passed through it. Although not actually owned by the Ministry of Pensions, it is staffed and generally financed by that department. The buildings are wooden hutments on brick foundations, and are surrounded by nearly 100 acres of grounds.

SCARLET FEVER.

SOME ASPECTS OF BACTERIOLOGY AND SERUM TREATMENT.

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THE investigations of the Dicks[1] since 1923 into the ætiology and treatment of scarlet fever, and the confirmation of their work by others, have resulted in a great advance in our knowledge not only of scarlet fever but also of all infections due to hæmolytic streptococci. It is known that the hæmolytic streptococcus produces a different disease according to the virulence of the organism, the susceptibility of those attacked and the kind of tissue invaded. At the present time there is a weight of evidence in favour of the conception that scarlet fever, puerperal fever, erysipelas, streptococcal tonsillitis, and septicæmia can be caused by similar strains of hæmolytic streptococci.

The results of certain investigations into cases of scarlet fever admitted to the Ilford Isolation Hospital during a period of two and a half years are interesting as regards (1) the bacteriological examination of 265 consecutive cases, January to October, 1928, with the addition of four cases complicated by mastoiditis which were admitted in 1929; and (2) the complications of a series of 670 consecutive serum-treated cases from April, 1926, to October, 1928.

Bacteriology.

Smith,[2] Griffith,[3] and James[4] originally described three distinct serological types of *Streptococcus scarlatinæ*, and to these a fourth type has been added by Griffith.[3] This leaves a large group of hæmolytic streptococci which are inagglutinable with the four type sera. As a result of an investigation into the serological differences of 101 scarlatinal strains of hæmolytic streptococci and 30 non-scarlatinal strains, McLachlan and Mackie[5] state that although certain serological groups among scarlatinal streptococci may be recognised as corresponding generally to types described by Smith and Griffith, there is such considerable antigenic overlapping among the different groups that the differentiation and relationship of strains cannot be expressed satisfactorily by formulating definite serological types. Gunn[6] attempted to correlate the relationship between the various types of hæmolytic streptococci described by Griffith with clinical types of scarlet fever, and stated that his results indicated that type 2 produces the most severe form of scarlet fever, type 3 is intermediate in severity, type 1 is as severe as type 3, and type 4 is the mildest type, while the inagglutinable strains vary in virulence.

TABLE I.—*Incidence of Types of Hæmolytic Streptococci in Cases of Scarlet Fever.*

—	Ilford Isol. Hosp.	Gunn. 1926.	Gunn and Griffith. 1927.	Smith, J.	Mackie and McLachlan.
	Per cent.				
Type I. ..	11	2	8·8	57	31
,, II. ..	18	36	15	27	22
,, III. ..	8·8	18	28	—	—
,, IV. ..	8·2	24	13	—	—
Inagglutinable.	53·9	18	34	—	—

The serological typing of the strains from our cases was performed by Dr. A. B. Rosher, of the Charing Cross Institute of Pathology. Swabs were taken from the throats of 265 cases on admission, and 191 gave positive results. Six showed mixed serological types. The distribution in the other cases is compared in Table I. with the results of other workers.

An attempt has been made in Tables II. and III. to investigate any relationship which may exist between various types of hæmolytic streptococci and the clinical aspects of the disease in the Ilford series of cases.

TABLE II.—*Incidence of Early Severity of Disease According to Type of Hæmolytic Streptococcus.*

Type ..	I.	II.	III.	IV.	Inagg. hæm. strep.
Pyrexia duration in hours*	41·1	41·5	38·8	29·9	35·2
No. of cases vomiting ..	12 (60%)	18 (56%)	8 (53%)	5 (35%)	44 (46%)
Early adenitis	5 (20%)	5 (15%)	3 (20%)	2 (13%)	21 (22%)

* Average (from time of administration of serum).

TABLE III.—*Type of Hæmolytic Streptococcus in 182 Cases of Scarlet Fever with Complications.*

Type.. ..	I.	II.	III.	IV.	Inagg. hæm. strep.
Complicated cases ..	6	10	6	4	32
Rhinitis	2	2	3	1	9
Adenitis	2	8	3	1	18
Otitis	1	2	1	—	11
Tonsillitis	—	1	1	—	3
Suppurative adenitis	—	1	—	—	—
Relapse	1	—	—	—	1
Mastoiditis	—	—	—	—	—
Nephritis	—	1	1	—	1
Abscess	1	—	—	—	—
Vaginitis	—	—	—	1	—
Rheumatism	—	—	—	1	2
Albuminuria ..	—	—	—	—	1

This table is exclusive of complications found to be due to a different type of hæmolytic streptococcus to that found in the primary infection.

Tables II. and III. indicate that types 1, 2, and 3 resemble each other in producing the most severe initial symptoms of scarlet fever, type 4 the mildest, while the inagglutinable group occupies an intermediate position. Type 2 appears to be the most likely to produce complications, type 4 the least, type 3 more than type 1. The inagglutinable group varies from frequent to low incidence of complications. These results confirm those of Gunn. When, however, it is remembered that 53·9 per cent. of the hæmolytic streptococci in our series, and 34 per cent. in Gunn's series were not typeable, it is obvious that it is unsound to base any final conclusion on these figures. In addition, it should be noted (1) that the numbers dealt with are small, and (2) that more complications would be present if those due to a different type of organism to that in the primary infection were included. In 24 cases where hæmolytic streptococci were found in the throat on admission, they were found also in the complication. The hæmolytic streptococcus in the primary infection and in the complication were apparently the same in 14 complicated cases, although in six of the cases the streptococcus, either from the fauces on admission or from the complication, was not typeable. The complications which occurred in the 14 cases were: relapse (1); rhinitis (3); abscesses (3); puerperal fever (1); otitis (6); mastoiditis (7). The streptococcus in the primary infection and in the complication was apparently different in ten complicated cases, although it will be noted that in a number of cases the streptococcus in the complication was not typeable.

The results given in Table IV. appear to show that some complications in scarlet fever are due to reinfection with a different type of hæmolytic streptococcus to that in the primary infection. Although cross-infection with septic complications has been known for many years as an administrative problem in isolation hospitals, it is not clear that either our results or those of Gunn definitely demonstrate that such infection is always due to a streptococcus of a different type from that in the primary infection.

The inagglutinable group of hæmolytic streptococci appears to be made up of: (1) strains of hæmolytic streptococci which do not agglutinate with the type sera under any conditions, and (2) hæmolytic

TABLE IV.

Type at onset of attack.	Complication.		Type at onset of attack.	Complication.	
	Nature of.	Type.		Nature of.	Type.
I.	Tonsillitis.	Inag.	III.	Rhinitis.	II.
II.	,,	IV.	III. & Inag.	,,	Inag.
III.	,,	Inag.	IV.	,,	II.
I.	Rhinitis	,,	IV.	,,	Inag.
II.	,,	,,	II.	Vaginitis.	I. & Inag.

streptococci which under certain conditions lose or acquire the power to agglutinate the type sera. For instance, in ten cases in our series it was found that inagglutinable strains of hæmolytic streptococci on repeated subculture yielded an organism agglutinable with one of the four type sera. This fact prevents any dogmatic deductions being drawn from any statistics as to incidence of type, severity of type, or incidence of complications in relation to type. Where complications have been shown to be due to a different type of hæmolytic streptococcus, one must omit all cases belonging to the inagglutinable group, for the strain may have changed in the same patient from a typeable to a non-typeable strain, or vice versa. Although four distinct types can be differentiated by serological means, before these types are accepted as being of clinical value, further investigation is required as to (1) antigenic overlapping, and (2) interconvertability of the four types.

In considering the question of complications being produced by reinfection with a different type of hæmolytic streptococcus, one has to consider also the possibility of the original infection being caused by more than one type of hæmolytic streptococcus, although only one type has been found by the methods used. The same problem exists as in the investigation of the virulence of diphtheria bacilli, where non-virulent and virulent colonies may be present. If the investigator happens only to subculture the one type of colony, an erroneous result is obtained.

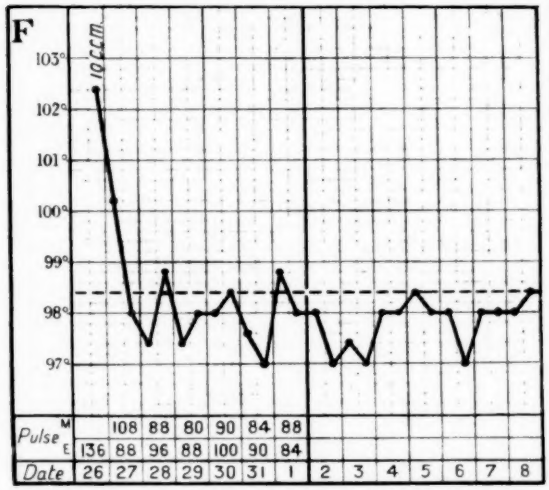
Gunn[6] has stated that in a series of non-serum treated cases, failure to acquire complete immunity was never found in patients infected by hæmolytic streptococci of the types 1, 2, and 3. We found that, including all sizes of reaction, cases which were infected with types 1, 2, or 3 gave the least number of positive Dick results during convalescence, and those with type 4 the greatest number. We analysed the results of the bacteriological examination of 29 cases admitted from 14 families. These showed type 2 in three families, type 4 in one family and inagglutinable streptococci in four families, while in six families, one or more members showed one of the four types, while the other member had an inagglutinable strain.

Gunn and Griffith[7] have stated that, although 55 patients in their series were discharged from hospital "carrying" hæmolytic streptococci, as far as could be ascertained none of these gave rise to any return cases. In the Ilford cases, however, hæmolytic streptococci were found in five patients, examined at various periods from 11 to 21 days after their discharge from hospital, who had given rise to eight return cases in their own families. Of these five patients, three showed inagglutinable streptococci, one showed type 2, and one type 3, while the fifth showed a mixture of inagglutinable streptococci with type 4. We were only able to obtain positive results in three of the return cases. (In one of these, the infecting case had inagglutinable streptococci, while the two return cases both had inagglutinable streptococci. In the other case, while the infecting case had inagglutinable streptococci, the return case showed type 2 hæmolytic streptococci.)

Effects of Serum Treatment.

Since April, 1926, all cases of scarlet fever admitted to the Ilford Isolation Hospital have been treated with scarlatinal antitoxic serum. Every case was given antitoxin as a routine measure because: (1) as scarlet fever antitoxin is a specific remedy it should be of value in every case of disease due to the specific organism, and (2) mild cases of scarlet fever may yet develop severe complications, and it is only by administering the serum to all cases that such complications may be avoided.

The series which we describe comprises 670 consecutive admissions. Only concentrated serum was



Temperature chart of a female patient aged 27, admitted to hospital with scarlet fever on first day of rash, showing critical fall of temperature after injection of 10·0 c.cm. of antiscarlatinal serum. In this case the infecting organism was a streptococcus of type 2.

used, and the routine dose was 10 c.cm., injected intramuscularly. Repeated doses were given in 7 per cent. of cases. Intravenous administration was not used as a routine measure because it was considered unjustifiable to expose young children to a possible fatal therapeutic risk in a disease which at the present time is usually non-fatal. Our policy in this respect is confirmed by Toomey and Dolch,[8] who had three deaths with anaphylactic symptoms out of 40 patients injected intravenously, and also by the series of 404 cases treated intravenously by Banks and Mackenzie,[9] where one death with anaphylactic symptoms resulted. We are of the opinion that intravenous therapy should be reserved for toxic cases. In our cases the intramuscular administration of serum was attended by no ill-effects.

A serum rash occurred in 24·5 per cent. of the cases. It caused very little inconvenience, and was usually accompanied by no rise in temperature. No other symptoms of serum sickness were observed. Of 27 cases desensitised owing to a previous history of administration of serum, 14 developed a serum rash with no other symptoms. In all our cases we administered calcium salts, as suggested by Rolleston,[10] and although it is impossible to give any statistical evidence, our opinion is that they reduced the incidence of severe serum sickness. (We observed, for instance, in the diphtheria ward that when the administration of calcium salts was discontinued for a time, serum rashes were much more severe and accompanied by more constitutional disturbance.) The effect on the patient of the administration of the serum was in all cases very marked. The temperature fell to normal by crisis in over 60 per cent.; in some cases it tended to be unsettled after the fall. There was a rapid improvement in the subjective condition and relief of the faucial congestion. There appeared to be no relationship between the day of the disease on which the serum was given and the effect on the pyrexia. Toxæmia is combated by antitoxin whether the serum is given on the first or the fifth day of the disease, but antitoxin will not repair the damage done to the tissues before administration.

It is extremely difficult to produce any satisfactory evidence of the value of scarlatinal antitoxic serum as a routine measure in all cases, as at the present time this disease is so mild. Other writers have attempted to assess it by stating (1) that the length of stay in the hospital can be shortened, (2) that the incidence of complications can be considerably reduced, and (3) that septic complications can be avoided. As the temperature becomes normal 24 to 36 hours after administration of the serum, a large proportion of the cases could be discharged within a fortnight or less, and if this were done (as by Banks and Mackenzie),[9] the number of complications which would occur in hospital would be very considerably reduced. Unless, however, all the cases were systematically followed up for some weeks after their discharge from hospital, no true indication of the number of complications could be obtained. The early discharge of patients suffering from scarlet fever has the advantage of minimising the risks of cross-infection, and all complications arising from this cause. In our own series, mild uncomplicated cases were usually discharged after 28 days, while complicated cases averaged a stay in hospital of seven to eight weeks. It is impossible to quote any figures which would be of use in illustrating the value of scarlatinal antitoxic serum in reducing the length of stay in hospital, as many mild non-serum treated cases of scarlet fever which are uncomplicated could be discharged after 28 days or even before. We can only give the opinion that with the routine use of antiscarlatinal serum the number of such patients is considerably increased.

In assessing the incidence of complications, the selection of "control" cases is most important, and constitutes a very difficult and almost an insoluble problem. Alternate cases used as controls are open to the objection that the control may be milder or more severe than the treated case. A chosen series of cases for many years is also of no value, as the type may be milder and the complications different in different years. A good example of the variation of one complication in different epidemics is given by the late C. B. Ker.[11] In 15,216 cases comprising three series, the percentage incidence of nephritis was 11·0, 5·64, and 8·75 respectively. Tables IVA. and V. show the variation in the incidence of complications in our own cases, (*a*) taking the first 500 and comparing them with the following 170, and (*b*) comparing the first 18 months with the second 13 months.

In a review of the literature on this subject, J. A. Toomey[12] very rightly attacks the whole question of

TABLE IVA.—*Serum-treated Cases.*

First 500 cases	(per cent.)	Following 170 cases (per cent.)
Adenitis ..	.. 13·2	10·0
Otitis ..	.. 5·6	7·0
Nephritis	.. 1·8	0·56
Relapse ..	.. 4·6	—

TABLE V.—*Serum-treated Cases.*

April to Sept., 1927. 18 months.		Sept., 1927, to Oct., 1928. 13 months.	
No. of cases	301.	No. of cases	369.
	per cent.		per cent.
Adenitis	7·6		16·2
Otitis	4·0		7·6
Mastoiditis	0		1·3
Albuminuria (including nephritis)	3·3		3·3
Nephritis	2·3		2·15
Rheumatism	1·6		1·9
Relapse	4·3		2·7
Total ..	23·1		35·15

inadequate control, and emphasises the importance of the great factor of variability in scarlet fever. It is not possible to include all the incidental, accidental, and variable factors necessary to select true "control" cases in scarlet fever. Such an accidental factor as crowding of wards in epidemics, leading to an increase in the number of complications, does not appear in published statistics relating to complications. At the Ilford Isolation Hospital during the period under review, 33 per cent. of the cases developed complications, as shown in Table VI.

TABLE VI.—*Complications in 670 Serum-treated Cases of Scarlet Fever.*

Nature of complications.	Cases and per cent.	Nature of complications.	Cases and per cent.
Adenitis	83 (12·4)	Suppurative adenitis	5 (0·7)
Albuminuria: Total (including nephritis)	22 (3·29)	Mastoiditis	5 (0·7)
Nephritis	15 (2·2)	Pneumonia and broncho-pneumonia	2 (0·3)
Otitis	40 (6·0)	Pharyngeal abscess ..	1 (0·15)
Rheumatism ..	12 (1·8)	Bronchitis	2 (0·3)
Relapse	23 (3·2)	Pyelitis	1 (0·15)
Rhinitis	58 (8·7)	Abscesses	2 (0·3)
Tonsillitis—		Peritonitis (and puerperal sepsis) ..	1 (0·15)
Total	19 (2·8)	Vaginitis	3 (0·45)
Suppurative ..	6 (0·9)		
Paronychia	28 (4·2)		

Mortality = 0·45 per cent. (exclusive of 1 case of puerperal fever).

Day of disease = day of rash.

Table exclusive of rhinitis, adenitis, and albuminuria at onset, and of complications following relapse.

Only one toxic case was treated and, although improvement was manifested for a time after large doses of scarlet fever antitoxin (180 c.cm. being given within three days) the patient succumbed from lobar pneumonia. A second death occurred in a woman admitted suffering from scarlet fever and puerperal fever. Inagglutinable hæmolytic streptococci were present in the throat and uterine cervix. The patient died after an operation for peritonitis.

Friedemann and Deicher[13] found hæmolytic streptococci in the pus of septic complications but not in the desquamation nor in the urine. Our own results confirm this, as hæmolytic streptococci were found in the nose, throat, and in the pus of septic complications, but not in the urine in cases of nephritis. It will be noted that, although antitoxic serum was administered on admission, yet suppurative complications occurred. These included 40 cases of otitis media, 6 of suppurative tonsillitis, 4 of suppurative adenitis, 1 of suppurative adenitis followed by pharyngeal abscess, 2 of other abscesses, 3 of vaginitis, 28 of onychia, and 5 of mastoiditis. The cases of mastoiditis we have grouped in Table VII., and have included 4 cases of mastoiditis which occurred in 1929.

TABLE VII.

Day of adminis. of antitoxin.	Dose of antitoxin.	Day of onset of otitis.	Dick test.	Day of onset of mastoiditis.	Type of hæm. strep.		
					Fauces on admission.	Pus from ear.	Pus from mastoid.
2	10	7	Neg.	14	Inag.	Neg.	Neg.
16	15	16	Pos. ¼	30	III.	III.	III.
2	20	6	,, ¼	35	Inag.	Inag.	Neg.
1	10	39	,, ¼	54	,,	,,	Inag.
2	10	1	Neg.	51	Neg.	Neg.	Neg.
2 to 5	60	4	,,	5	III.	Staph.	III.
2 to 3	30	4	,,	5	II.	II.	II.
1	10	32	,,	35	I.	I.	I.
2	10	14	,,	42	III., I., & II.	Neg.	Inag.

It will be observed from this table: (1) that the early administration of serum did not prevent the development of otitis media nor of mastoiditis; (2) that repeated doses of serum did not prevent the early onset of mastoiditis; (3) that the Dick test was negative six times out of nine when mastoiditis developed; (it was also negative six times out of seven at the onset of otitis media); (4) that the type of hæmolytic streptococcus when found was the same in the throat, ear, and mastoid. Apparently, therefore, routine treatment of cases of scarlet fever with antitoxin will not prevent suppurative complications. It is probable that in such cases the streptococcus has invaded the tissue and the antibacterial action of the serum is not sufficient to combat it. Ten of the 15 cases of nephritis occurred within the usual period, the second to the fourth week, while five were met with later. Thus the appearance of this complication is not delayed by treatment with antitoxin. Two cases of nephritis following relapses are not included in the total. Nephritis was rarely accompanied by pyrexia unless another complication was present at the same time—for example, adenitis. Œdema was limited to the eyelids. Neither diet, period of rest in bed, nor initial severity of the disease could be designated as causes of the nephritis. Incidentally, there appears to be no reason why scarlet fever patients should not receive adequate diet and get up as soon as their local and general conditions permit. It is doubtful whether repeated doses of serum would prevent nephritis. All we can say is that only one case out of over 200 has developed this complication since repeated doses of serum were used more widely. The Dick test was usually negative at the time of the clinical manifestation of the kidney condition, showing that uncombated toxæmia was not occurring in the body at that time. The following questions arise: when and how are the kidneys damaged? why are some cases singled out? and why does the incidence of nephritis vary so much in different years? It seems that in some individuals either (1) the glomeruli of the kidneys are very susceptible to damage by scarlet fever toxin, or (2) they are unable to secrete toxin at the ordinary rate, or (3) their kidney cells are unable to recover from toxic action, or (4) there is another factor present in addition to the initial toxæmia—e.g., acidosis. This is believed to be the cause of the condition by Berry[15] and Carter.[16] An acute recrudescence of nephritis in hospital appears to be rare.

Case No. 55/28, aged 6½ years, was admitted on the first day of a typical scarlet fever ordinary attack. 10 c.cm. of antitoxin were given and type 3 *S. scarlatinæ* found in faucial swab. On the 8th day he developed cervical adenitis, on the 13th day tonsillitis, and on the 14th day nephritis, which cleared up after 12 days. On the 56th day the patient was up in ward; on the 79th day he had rhinitis with a *S. scarlatinæ*, type 2. On the 83rd day he developed nephritis, but with no streptococci in the urine. He recovered.

Immunity in Convalescence.

We have previously expressed our view on the effect of scarlatinal serum in increasing the number of Dick-positive reactors during convalescence in scarlet fever.[17] This has since been confirmed by Brown.[18] We also considered this question in relation to the incidence of relapses. Table IV. shows that, whereas in the first 500 cases in which no special precautions were taken the relapse rate was 4·6 per cent., no relapse occurred in the last 170 cases when the precautions mentioned in our previous article were taken. As in the cases described by Griffith and Gunn,[7] the relapses occurred in Dick-positive cases. Unfortunately in only one of the relapses were we able to obtain hæmolytic streptococci in the fauces, both in the primary infection and in the relapse, and in this case the organism, in both instances, was inagglutinable.

D. S. Sutherland[19] has reported on the value of the active immunisation with scarlet fever toxin of Dick-positive reactors convalescent from scarlet fever. This method was tried by us in 56 cases which gave a Dick-positive result at the end of the third week of disease. Of these cases one showed hæmolytic streptococci on admission to hospital and three had mixed types of streptococci; of the remaining 53, 26 (49 per cent.)

were converted from Dick-positive to Dick-negative reactors before their discharge. The average dosage of scarlet fever prophylactic employed was 500, 1000, 2000, 2500, 3750, and 5000 units at weekly intervals. Some of the cases remained in hospital only two weeks from the time of the first dose. These might have been converted if they had had the full course. Nineteen cases were converted to negative after one dose in seven days; one case after two doses in 14 days; three cases after fourteen doses in 21 days, and of the remaining three cases, one was converted after nine doses in 70 days. (This was a case of mastoiditis which had been operated upon.) The Dick-positive reaction became fainter with succeeding doses of the prophylactic. The classification of the cases according to the type of organism concerned is given in the following table.

Type.	I.	II.	III.	IV.	Inag.	Total.
Converted.. ..	3	4	1	1	17	26
Not converted ..	2	2	1	3	19	27

Little can be deduced from this table owing to the small figures, but the cases infected with type 4 appear to be less readily rendered immune than those infected by other types. Twenty-one of the cases had or developed complications; 47·9 per cent. of these were converted. Two of type 4 complicated cases were not converted. We have formed the opinion that, although it is possible to convert convalescent patients who are Dick-positive reactors to Dick-negative reactors by a course of injections of scarlatinal toxin, yet the proportion of cases so converted within a short period of time is insufficient to be of administrative value—that is, it is not of value for the prevention of reinfection during the further stay in hospital. We consider that the more practical method is either to isolate such cases or to immunise them passively after desensitisation with anti-scarlatinal serum.

The Effect of Serum Treatment on Complications.

Although we do not suggest that it is in any way an adequate control, we have compared in Table VIII. the percentage of complications in 517 consecutive cases admitted during 1922–25 with our present series.

TABLE VIII.—*Ilford Isolation Hospital.*

—	April, 1926–October, 1928.	1922–1925.
	Serum-treated 670 cases (per cent.)	Non-serum treated 517 cases (per cent.)
Adenitis	12·4	21·8
Albuminuria ..	3·29	8·7
Otitis	6·0	9·7
Rheumatism ..	1·8	5·8
Total percentage..	23·49	46·0

The control is of some value in that our present series consists of cases occurring during an epidemic period when scarlet fever was of a severer type than in the preceding three years. It will be noticed that the reduction in the incidence of complications is most marked in rheumatism, a toxic condition, and least marked in otitis, a septic condition. After a careful scrutiny of the 223 complicated cases we have not been able to establish the thesis that the day of disease on which serum is given influences the incidence and day of onset of complications in scarlet fever. This work does not support the view advanced by McLachlan and Hunter,[20] Scott,[21] and Craig,[22] that the earlier the serum is given the less the incidence of complications. In our opinion there are other factors determining whether a case will be a complicated one or not. Possibly it is not a question of "days" after the appearance of the rash, but the period prior to the exanthem or at its actual onset when the streptococcus is enabled to penetrate before antibacterial resistance is developed. Table IX. is an analysis of the complications with the day on which the serum was given and the number of times the complication occurred.

TABLE IX.

Day serum given.	Suppurative adenitis.	Rhinitis.	Otitis.	Nephritis.		Rheumatism.		Relapse.	Tonsillitis.	Supp. tons.	Onychia.	Mastoiditis.	Pneumonia.	Pharyngeal abscess.
				2–4 weeks.	Later.	Early.	Late.							
1st	3	19	12	3	—	2	3	3	3	—	8	1	1	1
2nd	—	21	13	—	1	2	—	13	5	1	10	3	1	—
3rd	1	9	7	4	—	—	1	4	2	3	6	—	—	—
4th	1	5	2	1	1	2	2	3	1	1	1	—	—	—
5th and over.	—	4	6	2	3	—	—	—	2	1	3	1	—	—

A suggestion has been made that complications in cases of scarlet fever are delayed and not prevented by the use of scarlatinal antitoxin.[24] The administrative procedure as regards routine day of discharge from hospital will influence the number of delayed complications. In some hospitals all clean cases are discharged at the end of four weeks or before; in others not until the sixth week. Therefore any complication arising in hospital in a previously uncomplicated case after the twenty-eighth day might be classified as a delayed complication. McLachlan and Hunter[20] in serum-treated cases have recorded 3·75 per cent. with complications (excluding debility) occurring primarily after discharge from hospital; in addition, 6·6 per cent. recurring after discharge from hospital, a total of 10·35 per cent.

In a series of 500 non-serum treated cases followed up at Bristol, 12 per cent. of cases suffered from complications after discharge from hospital.[14] The fallacy in collections of figures of this kind is that—apart from cases actually seen by a medical practitioner after discharge—the report is based on the history given by patients or parents. Even so, our series of serum-treated cases does not compare unfavourably with non-serum treated ones. 557 of the serum-treated cases discharged from the Ilford Isolation Hospital were investigated (313 by medical officers and 244 by sanitary inspectors). 10 per cent. of the cases developed complications after discharge, of which 2 per cent. were recurrences of conditions arising in hospital.

Number of Times Complications Occurred.

Rhinitis	21	Pleurisy	1
Otitis	11	Heart	3
Rheumatism	7	Chorea	1
Nephritis	4	Onychia	2
Adenitis	2		

After relapses in hospital two cases had recurrence of rhinitis; one developed a primary otitis and one a primary otitis and nephritis, one endocarditis, and one rheumatic fever after discharge. The figures exclude anæmia and debility.

Results and Conclusions.

1. Out of 265 cases, 191, or 79 per cent., on admission showed hæmolytic streptococci in their fauces.

2. Of the hæmolytic streptococci in the above series, 46·1 per cent. of the cases could be classified under one of Griffiths' groups, the remaining 53·9 per cent. being inagglutinable with the type sera. Certain of these strains became agglutinable on repeated subculture.

3. In view of the large percentage of inagglutinable hæmolytic streptococci, it is impossible accurately to correlate the type of streptococcus with the clinical type of scarlet fever. As far as our present knowledge

goes, however, type 4 appears to be the least virulent, and type 2 the most virulent of the typeable streptococci.

4. In 24 complications a hæmolytic streptococcus was found both in the fauces and at the site of the complication; in ten cases the type was different in the latter to the former. This appears to indicate cross-infection with a different type of streptococcus. In view of the presence of inagglutinable strains of streptococci and the possibility of an original mixed infection, no dogmatic statement can be made at present.

5. The results of routine treatment of cases of scarlet fever with antiscarlatinal serum are good, but do not compare with the use of antidiphtheritic serum in diphtheria. Our experience does not bear out the statement of Toomey and Dolch[8] that serum sickness is usually more severe than the disease itself. Such evidence as we have at our disposal indicates that antiscarlatinal serum markedly reduced the number of toxic complications. It also reduces the number of septic complications, but not so markedly. It does not delay the onset of complications.

6. Modern investigations show (*a*) that there is a considerable proportion of Dick-positive reactors in convalescent scarlet fever patients, (*b*) that the number is increased in cases treated with antiscarlatinal serum, (*c*) that there is a certain amount of evidence that cross-infection with different types of hæmolytic streptococci occurs, (*d*) that hæmolytic streptococci persist longer in the throats of patients nursed in hospital than they do in cases nursed at home.[23] We are of the opinion that the present system of nursing scarlet fever patients in general wards will ultimately have to be discontinued, and, if such patients have to be removed to hospital, they will require to be treated in cubicle wards at least until their immunity and—when our knowledge is a little more advanced—their type of infection can be accurately determined.

7. The active immunisation of convalescent scarlet fever patients who are Dick-positive with scarlatinal toxin is not a satisfactory solution of the administrative problem of dealing with such cases.

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QUEEN'S HOSPITAL FOR CHILDREN.—This hospital of 134 beds last year received 1818 in-patients. Their average stay was 24 days and their cost £11 1*s.*; the 32,708 new out-patients cost 5*s.* 8*d.* each. The Bexhill Home received 183 in-patients at a cost of £13 14*s.* 10*d.* each. The hospital has an arrangement with the London County Council for the dental treatment of school-children, and is one of the largest centres in London for such cases. Towards the income of £33,514 patients contributed £5927, but there was a deficit of £722.

Clinical and Laboratory Notes.

DIAGNOSIS AND TREATMENT OF ANÆMIA IN SCHOOL-CHILDREN.

WITH SPECIAL REFERENCE TO THE HÆMOGLOBIN CONTENT OF THE BLOOD.

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THIS investigation was begun in January, 1928. At first nothing more was done than to record on the medical card of each child the hæmoglobin content of the blood on admission and on discharge from the open-air school. The great majority of children admitted to this open-air school belong to that group of subnormal physical health usually labelled "malnutrition and anæmia," or "pretuberculous," and there are thus few definite physical signs other than pallor, perhaps palpable cervical glands, and anatomical unfitness in weight or build, together with a history either of recurrent illness, often vague in character, or of living or having lived in association with a relative suffering from tuberculosis. Often a combination of these facts is reported.

To estimate the hæmoglobin von Fleischl's hæmometer was used. In order to compare the figures with those of other investigators the apparatus was tested against Haldane's hæmoglobinometer, which appears to be the most commonly employed, but which could not be used in this experiment as there is no coal-gas at the school. Ten persons were tested by both methods and, excluding three cases where there was recognisable technical error—viz., in completely filling the Haldane capillary tube—the results were: four cases gave identical readings; two cases gave readings 2½ per cent. higher with von Fleischl's apparatus; and one case gave a reading 1½ per cent. higher with von Fleischl's apparatus.

If a reading on von Fleischl's apparatus were (e.g.) above 50 but below 55 it was called 52½. Thus the results indicate that the two methods give closely related values. A dark room and an electric lamp of the same power were always used with von Fleischl's apparatus.

The Normal Hæmoglobin Percentage.

Some difficulty is felt in deciding what the normal percentage of hæmoglobin is in a "healthy" child. S. C. Dyke [1] has stated that "whatever method of estimating hæmoglobin is used the percentage in normal people (evidently adults) is below 100." He goes on to say that 80 to 105 may be regarded as being within normal limits, 60 to 80 as showing anæmia, and that figures below 60 indicate need for treatment.

In the course of the present inquiry the hæmoglobin was estimated in 45 children who were said to be "well"—i.e., they were not receiving medical attention and were attending regularly an elementary school in the centre of the town. Table I. gives the figures in this control group and in the first group of 55 children examined at the open-air school. The latter when tested had already been in the open-air

TABLE I.

Hæmoglobin (per cent.).	Control group (No.).	45 children (per cent.).	Open-air school group (No.).	55 children (per cent.).
Below 40	0	—	0	—
40– 50	1	2·2	1	1·8
51– 60	3	6·6	10	18·0
61– 70	11	24·4	23	41·8
71– 80	12	26·6	11	20·0
81– 90	13	28·8	8	14·5
91–100	3	6·6	0	—
101–105	2	4·4	0	—
106–110	0	—	1	1·8
111–115	0	—	1	1·8
116–120	0	—	0	—
Total	45	99·6	55	99·7

[1] Dyke, S. C.: THE LANCET, 1928, ii., 936.

school for about three months. Both groups are composed of approximately equal numbers of boys and girls, and the ages are similar.

This table shows that in the control group the majority (36 children) give hæmoglobin estimations between 61 per cent. and 90 per cent., while in the open-air school group the majority of the children (44) give estimations between 51 per cent. and 80 per cent. —i.e., the subnormal group of children have hæmoglobin values about 10 per cent. lower than those of the healthy children. Again it is evident that whereas in the control group 32·2 per cent. of the children give readings of 70 per cent. or lower and 66·4 per cent. higher readings, almost exactly the reverse is true for the open-air school-children, since 61·6 per cent. of these children give readings of 70 per cent. or lower and 38·1 per cent. only give higher readings. This suggests that the line of demarcation between health and ill-health might be placed at about 70 per cent.

Results of Attendance at Open-air School.

By Easter, 1929—at the end of four terms during which this work has been carried out—it was observed that between 50 and 60 per cent. of all the children admitted to the open-air school gave a higher hæmoglobin value, whatever their original figure, when tested before discharge from the school. Table II. gives the details for the first 55 children who were discharged; they are the same children as in the first table.

TABLE II.

Hæmoglobin estimation.	No. of children.	Per cent.
Increased	31	56·3
Unchanged	6	10·9
Decreased	18	32·7
Total	55	99·9

This percentage of improvement remained fairly constant for the children who were discharged each term, although the time spent in the school varied in individual cases by as much as one year. It is a day open-air school where the children remain from 9 A.M. until 4.30 P.M. in winter and 5.30 P.M. in summer; dinner and tea are provided, also milk at 10.15 A.M. It should be noted that all the children improve in physical fitness as judged by improved general appearance and increased muscle tone, appetite, weight, and activity.

Result of Administering Iron.

As the result of dissatisfaction with the relatively low improvement rate in the children's hæmoglobin values, it was decided to administer iron, following the lines of the work done by Dr. Helen Mackay,[2] adopting provisionally as normal the figures 80 per cent. to 105 per cent. The children to whom iron was to be given were selected as follows: Eighteen children were picked out by the school nurse as not having improved in general condition, in her opinion, in spite of fairly regular attendance for between 6 and 12 months. All but 4 of these gave hæmoglobin figures under 80 per cent., but 11 (61 per cent.) gave a higher reading than on admission, thus falling in with the improvement percentage found each term in the children discharged. The 14 children with hæmoglobin values below 80 per cent. were given iron, and are known as the "special" treated group. Of 82 other children in the school at that time, 51 had hæmoglobin values under 80 per cent.; the first 25 in alphabetical order of this 51 were given iron and the remaining 26 were not given iron, in order to form a control group. In all, 39 children received iron.

The mixture given was iron and ammonium citrate in chloroform water. The selected children were given two doses daily after meals, those over 10 years of age receiving a total of grs. 15 daily and those under 10 a total of grs. 7½ daily. This medicine was given five days weekly for ten weeks. There were a few complaints of constipation but none of indigestion. Clinically there was no striking improvement in the colour of skin or mucous membrane.

[2] Mackay, H. M. M.: Arch. Dis. Child., 1928, iii., 117.

The results, which are surprising in view of Dr. Mackay's work, are given in Table III. Only 33 of the original 39 who were given iron were available for the final estimation, and the control group also became smaller in number owing, in both groups, to absence from school during the period of experiment.

TABLE III.

Hæmoglobin estimation.	"Special" treated group.		Unselected treated group.		Control group.	
	No.	Per cent.	No.	Per cent.	No.	Per cent.
Increased ..	1	8·3	6	28·5	5	29·4
Unchanged ..	4	33·3	3	14·3	4	23·5
Decreased ..	7	58·3	12	57·1	8	47·1
Total ..	12	99·9	21	99·9	17	100·0

The numbers are small but clearly indicate that iron administered as described has had no significant effect on the hæmoglobin content of the blood in subnormal children, most of whom are pallid and debilitated, are described by clinical observers as "anæmic," and give a confirmatory reading on von Fleischl's hæmometer. This result contrasts strikingly with the observation that between 50 and 60 per cent. of the children admitted to the open-air school give a higher hæmoglobin estimation on discharge than on admission without being given an iron tonic.

Summary.

1. Hæmoglobin estimations were made in children on admission and on discharge from an open-air school.

2. The apparatus used to estimate the hæmoglobin was von Fleischl's hæmometer, which was compared with Haldane's hæmoglobinometer, and the difference in the figures given by the two instruments was found to be small.

3. A number of healthy children were tested to try to find the "normal" hæmoglobin value in children.

4. It was observed that between 50 and 60 per cent. of the children gave higher hæmoglobin readings on discharge than on admission to the open-air school.

5. Iron was administered in an attempt to obtain a higher number of increased hæmoglobin estimations. The effect was negligible.

These observations were made and published with the approval of Dr. R. M. F. Picken, medical officer of health.

THE ACTION OF EPHEDRINE IN RELIEVING CERTAIN PAINFUL ACCOMPANIMENTS OF LEPROSY AND LEPRA REACTION.

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THE treatment of leprosy does not end with the administration of some product of hydnocarpus oil, but must take within its scope the treatment of numerous complicating factors. These complications are frequently more trying than the disease itself. It is here that ephedrine has been found useful.

The first use of ephredine with which I wish to deal is its employment for the relief of the painful complications of lepra reaction. These are mainly, 1. Nerve pain. 2. Painful swellings of soft tissues. 3. Joint pains and headache. In previous communications to medical journals,[1 2 3] the power of ephedrine to relieve such distressing symptoms has already been demonstrated. The following illustrations afford further confirmatory evidence.

CASE 1.—An Indian male, aged 30. Advanced skin leprosy (B_2–B_3 Muir's classification). Complained of headache and pain all over the body; this was associated with fever ranging from 101°–103° F., and also with the eruption of fresh nodules on both arms. Ephedrine gr. ½ by mouth

was given. Within 15 minutes pain and headache were relieved. As fever had persisted for three days 0·02 g. potassium antimony tartrate was given every other day for one week, and the temperature gradually came down to normal.

CASE 2.—An Indian male, aged 35. (Mixed case, $B_2.A_2$.) Complained of much fever, nerve and joint pain; gr. ½ ephedrine in 1 drachm of water was administered. Within 15 minutes patient said the pain "had been miraculously relieved." Again pot. antim. tart. 0·02 g. was administered, and on second injection temperature returned to normal. On previous occasions patient stated he "had to suffer six weeks of fever."

CASE 3.—A male, aged 14. (B_3.) Complained of local swelling and pain on right side of face associated with fever coming on 12 hours after injection of 4 c.cm. Alepol. Ephedrine gr. ½ in 4 c.cm. of saline was injected subcutaneously. Pain disappeared almost at once and swelling subsided within 24 hours.

These cases once again illustrate that this drug has a powerful effect in alleviating some of the complications of lepra reaction. Chronic leprosy, however, brings certain painful sequelæ in its train. Therefore it was considered worth while to give ephedrine a trial. The conditions in which the drug was tried were: 1. Nerve pain of a persistent character unaccompanied by fever. 2. Burning and gnawing pains in joints of bones. The former type of pain is probably due to pressure of the contracting fibrous tissue in the nerve sheath, and therefore any relief can only be expected to be transient. The severe bone pains which occur are probably of a trophic nature. The following illustrate the result of ephedrine in such cases:—

CASE 4.—A Hindu female. (Mixed $A_1.B_2$.) Complained of constant gnawing pain in the internal cutaneous nerve of the forearm. The nerve was felt as a thick fibrous cord for about 4 inches, below the elbow. Ephedrine hydrochloride had been given orally with no relief. Half a grain of the drug in 4 c.cm. of saline was then injected underneath and along the course of the nerve. Pain diminished within half an hour, and the patient was comfortable for the next three days. About a week later pain recurred and the injection was repeated, again giving temporary relief. As the pain continued to recur, and because the nerve was so thick, an operation was considered necessary. Under a local anæsthetic about 4 inches of the medial cutaneous nerve of the forearm was exposed and freed from its sheath. The wound was then closed without drainage. The wound healed by first intention and gave permanent relief from pain up to the time of writing.

CASE 5.—A female. Advanced skin type, aged 30. (B_2.) Complained of gnawing pains along the course of the peroneal nerve, until the patient stated that she was unable to sleep. On March 3rd, 1929, gr. ½ was given orally with no relief. On March 5th gr. ½ ephedrine in 4 c.cm. saline was given subcutaneously along the course of the peroneal nerve. Pain diminished to a great extent in 20 minutes, and did not recur until March 26th. On this occasion the injection was repeated and again gave some relief. An operation would in all probability give permanent relief if patient would consent.

CASE 6.—Hindu male, aged 35. Advanced mixed case. ($B_3.A_2$.) Complained of very severe burning pains in hands and feet. Ephedrine gr. ½ orally gave no relief. Half a grain in 4 c.cm. saline subcutaneously gave relief within half an hour and pain did not recur for several days. On a repetition of the injection pain was again relieved.

CASE 7.—Hindu male, aged 45. Advanced nerve case (A_1–A_2.) Complained of aching in bones of dorsum of foot and hand; bones were markedly tender to pressure. As the patient was strong and healthy it was decided to inject ephedrine intravenously. Because all veins except those in the dorsum of the foot had become blocked the drug was injected into this situation. Relief was marked within 15 minutes, and the tenderness and pressure disappeared. The heart's action was markedly increased in force, but not so greatly in frequency, and a systolic bruit appeared which disappeared in half an hour when the action of the drug passed away.

Conclusions.

From this short series of cases it can be concluded that ephedrine by mouth gives almost instantaneous relief in nerve pains, &c., that accompany leper fever. I could not confirm Green's[2] conclusion that it influenced the pyrexia. For apart from pot. antim. tart. I noticed no effect, and concluded that it was this drug that controlled the fever.

In pains which accompany chronic leprosy ephedrine given subcutaneously, or, if the patient is strong and healthy, intravenously, is worth a trial. For nerve pain of the type described, operation must be eventually resorted to. For bone and joint pain which is so distressing then ephedrine appears to give temporary relief, and therefore is worthy of a trial.

I have to thank Prof. B. E. Read, of Peking, for further supplies of ephedrine hydrochloride, without which this investigation could not have been undertaken.

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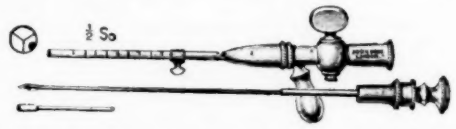
New Inventions.

A PNEUMOTHORAX INDUCTION TROCAR AND CANNULA.

IN the induction of pneumothorax with the Riviere trocar and cannula it is necessary to push the instrument down as far as the parietal pleura, withdraw the trocar, and then push the blunt cannula through the membrane into the potential pleural space. This method is advocated in order to avoid damage to the underlying lung. In practice we have found that it is unsatisfactory because considerable pressure is required to push the cannula through the membrane; the parietal pleura tends to be stripped off the ribs and there is a possibility of damage to the pleura and subsequent pleural shock. Further, if the pleura is not sufficiently anæsthetised the procedure



causes a considerable degree of pain. We have found that the best way to use the Riviere induction needle is to penetrate the parietal pleura with the sharp trocar which is then withdrawn. If the end of the cannula is in the pleural space, the manometer shows wide negative respiratory fluctuations. If not, the trocar has to be reinserted and further search for the pleural space ensues. The disadvantages of this method are: (1) if the end of the trocar projects much beyond the end of the cannula there is a possibility of piercing the lung; and (2) it is necessary to withdraw the trocar in order to see the manometric fluctuations. In order to overcome these difficulties, we have modified the Riviere induction trocar, as will be seen from the figure: (*a*) The point of the trocar is made to project as little as possible beyond the end of the cannula. (*b*) The trocar is grooved from its point to where the shaft is seen to be narrowed. The narrowing of the shaft is continued as far as where it corresponds to the cannula's side projection to which is attached the rubber tubing going to the manometer and the air reservoir. (*c*) The cannula does not have the lateral aperture which is a feature of the Riviere needle. The result of these modifications is that there is a continuous air space from the point of the needle to the manometer. Manometric fluctuations are set up as soon as the point of the needle enters the pleural space. The very short point of the needle practically precludes the possibility of damage to the lung. If necessary, air can be injected without withdrawing the trocar. The abolition of the lateral aperture does away with the possibility of air being injected at the same time into the tissues of the chest wall.

The instrument has been made for us by Messrs. Down Brothers, St. Thomas's-street, London.

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BRITISH MEDICAL ASSOCIATION.

ANNUAL MEETING IN MANCHESTER.

(*Continued from p. 501.*)

SECTION OF NEUROLOGY.

THE EPILEPSIES.

Dr. JUDSON BURY (Manchester) presiding, Dr. S. A. KINNIER WILSON (London) opened the discussion with a paper entitled Some Aspects of the Problem of the Epilepsies. He said he was under no delusion as to the complexity and intricacy of the subject. Were epilepsy not so involved a problem it would long ago have received at least a working interpretation, but the truth was that the condition defeated us on many grounds; its ætiology was heterogeneous, its semiology was indeterminate, its pathology dubious, and its therapeutics empirical. For the purposes of the discussion he could only single out one or two aspects to which attention might be usefully directed. They had been chosen intentionally as best calculated to indicate the range of the problem connected with the epilepsies.

1. *Clinical Features of Epileptic States.*

The first difficulty arose from the clinical polymorphism of epileptic phenomena. A major epileptic fit, when seen, was readily diagnosed, but the epileptic state was by no means confined to major seizures. Motor, sensory, psychical, and visceral variants all existed. We had also to consider the pre-seizure and post-seizure disorders. In taking a wide and psychogenic view of the question, the following points were to be remembered: (1) The epileptic aura was a sensation and thus a symptom belonging to the psychical series; it was something in consciousness. Herpi had long ago emphasised the hallucinatory nature of the phenomenon. (2) Interruption of the stream of consciousness might or might not accompany epileptic manifestations. Absolute unconsciousness might supervene without aura, but many fits ran their course with conservation of consciousness. (3) The motor condition of the fit usually consisted of convulsive movements. On the other hand, the whole of the motor phenomena might consist in mere flickers of a finger and thumb, quivering facial contractions, or a momentary spasm—even the absence of movement. (4) The sensory elements of a seizure, apart from the aura symptoms, constituted the whole attack. In many instances the aura was not followed by an attack. (5) The visceral components included circulatory, respiratory, vasomotor, rectal, renal, vagal, pupillary, and other phenomena. (6) Post-seizure manifestations embraced varied sets of opposites, from sleep to fugues, stupor to combativeness, speedy recovery to prolonged fatigue. All these phenomena emphasised the heterogeneous nature of epileptic manifestations.

2. *Inheritance of Epilepsy.*

Twenty-one years of practice and hospital experience had convinced Dr. Wilson that the hereditary factor was persistently overrated and the personal, or constitutional factor, underrated. The number of cases in which no hereditary element could be traced far exceeded that in which such a factor seemed responsible. Statistics were quoted by Dr. Wilson to support this contention. He considered that it was impossible to draw any other conclusion than that direct hereditary was of little moment in comparison with other inducing factors.

3. *Experimental Production of Convulsions.*

On the experimental side, normal animals could be made to develop convulsions with ease and certainty. Whatever the provenance of laboratory animals, they were also potentially capable of developing epilepsy. Study of methods revealed two main technical procedures for the production of convulsive states. These might be classed as (1) humoral, and (2) neural. These might act separately or interrelatedly.

(1) The *humoral* factor might be defined comprehensively as that component in the production of experimental epilepsy which consists in alteration of the body fluids and biochemical constituents, either mechanically or in connexion with exogenous or endogenous noxæ. Certain general conclusions recently arrived at by Lennox and Cobb showed that: (1) acidosis tended to inhibit, and alkalosis to augment seizures; (2) an increased tension of oxygen in the tissues tended to inhibit and a decreased tension to augment seizures; (3) œdema of the brain tended to increase, and dehydration to diminish seizures. Although these generalities merited attention the modes of action of the various factors had not been satisfactorily determined, and the separateness of their functions was not established. In other words, we were not in a position to say that the mechanical and the toxic components were always in essence contrasted or in their effect mutually and invariably independent.

As for the *neural* mechanism, it had been known for years that direct excitation of neural centres could result in the development of unilateral or generalised epileptic attacks.

4. *Occurrence of Convulsions in Pathological States.*

If the deductions of the experimentalist in respect of epileptic determinants were to prove of value they must be capable of substantiation from the clinical side—that is to say, there must be evidence that these, or some or other of these, played a part in the production of epileptic syndromes under pathological circumstances. Taking neural conditions first, we recognised a large number of diverse organic cerebral states in which epilepsy in one or other form made its appearance: (1) Cerebral tumours; (2) cerebral infections and toxic infections—e.g., encephalitis, syphilis; (3) cerebral toxic degenerations or scleroses (disseminated sclerosis, &c.); (4) cerebral trauma; (5) certain varieties of congenital and heredo-familial disease.

Humoral and vascular cerebral pathological conditions were: (1) disease of blood-vessels (thrombosis, arterio-sclerosis, &c.); (2) disorder of cerebral circulation (heart-block, anæmia, &c.); (3) disorder of cerebro-spinal fluid (hydrocephalus).

5. *Mechanism of Production of the Epileptic Seizure.*

The information garnered from the preceding sections could be summarised as implying the existence of three or four determinants for the production of epileptic phenomena.

1. *Mechanical Determinant.*—It had for many years been suspected, and often argued, that some connexion existed between the epileptic state and increase in amount and pressure of cerebro-spinal fluid; and the view had often been expressed that a relation could be established between the occurrence of the latter and failure in fluid absorption owing to arachnitis or other pathological local condition. Dandy, Fay, and Foerster had shown the existence of enlarged subarachnoid spaces more especially over the vertex and fronto-parietal regions; while, pathologically, subarachnoid collections of fluid, local œdemas, and such-like conditions had often been seen. Fay had recently added to our knowledge of this particular mechanism by his examination of the Pacchionian bodies in chronic epileptic brains, and had found various stages of sclerosis, calcification, atrophy, failure of development, and other abnormalities in these organs in epileptic subjects.

2. *Vascular Determinant.*—The consensus of opinion held that cerebral and general pallor or anæmia was more or less constantly visible to the eye just as the seizure commenced. This circulatory derangement or disorder was confirmed by the frequent observation of failure of the peripheral pulse at the outset, and the rarer one of constriction of retinal arteries at the

same moment. In 1903 the circulatory steps were epitomised by Hare as follows: (1) vasoconstriction; (2) cardiac inhibition (vagal); (3) sudden cerebral anæmia, causing unconsciousness and tonic spasm; (4) recommencement of the heart-beat causing rise of pressure, returning cerebral circulation, relaxation of tonic spasm, and clonic convulsions; (5) Re-establishment of blood pressure and cerebral circulation; cessation of convulsions. What was the proximate cause of the sudden initial vascular constriction? And where did it start? To the former question no satisfactory answer was as yet forthcoming. We did not know whether the vasomotor change began in the vasomotor centre of the bulb, or locally in the cerebral cortex, or distally, by way of reflex influence on the medulla or cortex.

3. *Humoral Determinant.*—The humoral or physiochemical determinant had received an immense amount of attention in recent times. Briefly, it must be considered as established that a number of conditions (hyperventilation, injections of various chemical substances, anoxæmia variously produced) caused experimentally a marked fall of O_2 tension in the tissues and were calculated to give rise to convulsions. "Contraction of cerebral vessels" remained unexplained. Lennox and Cobb, it was satisfactory to observe, were aware of the hiatus, for they admitted that "these processes are only contributory; they may be effective only in persons with a tendency to seizures, and with those having some pathology either in the brain, the body, or the emotional life."

4. *Neuronic Determinant.*—We were, therefore, brought back to the position which for some was still unassailed, that the essence of all epileptic semiology, major or minor, pre-seizure or post-seizure, psychical or visceral, was neuronic derangement, and that this derangement was of neuronic derivation. Nervous tissue could be, and was often enough, influenced by mechanical, vascular, and humoral agencies; but the secret of epilepsy—the core of the problem—resided in the qualities of the neural mechanisms exhibiting discharge.

The following considerations must be given due weight:—

1. The action of convulsants such as absinthe, producing fits in a normal animal, was much facilitated if the animal underwent any cerebral injury.
2. Single humoral or vascular factors, by themselves, were often insufficient to produce fits.
3. Only a small percentage of cases with head injuries and with histories of infective and other conditions reacted with fits.
4. The development of epilepsy in some organic brain states was in favour of a neural factor, seeing that no evidence of vascular or humoral anomalies was forthcoming in them.
5. A "susceptibility" or "tendency" could scarcely be ruled out in cases of direct heredity and of epilepsy in homologous twins.
6. The clinical occurrence of so-called reflex epilepsy strongly suggested a pure neural reaction.

It was therefore impossible to find one single common factor for the totality of epileptic manifestations, unless the significance of some inherent nervous factor, some functional propensity, was allowed. The only trouble was that at present we could not gauge "susceptibility" by reference to objective criteria.

6. *Influence on Epileptic Semiology of Other Intercurrent Affections.*

This, perhaps, deserved more attention than had hitherto been accorded it. As long ago as 1882 it was noticed by Bourneville and Bonnaire during an epidemic of measles in epileptics and idiots at the Bicêtre that while the intercurrent affection lasted fits were much decreased in force and frequency, and similar observations were recorded by Seglas.

So far as Dr. Wilson had discovered no attempt had been made by Gowers or any of the other authors mentioned to explain the way in which this influence may be, theoretically, exerted. According to Hare, however, it was the pyrexia which was of significance, for it involved general vascular relaxation, and he argued that vasodilatation was similarly of value in cutting short attacks of both asthma and migraine. Whatever the explanation, it might yet turn out to be of importance from a pathogenic and a therapeutic standpoint that epileptic manifestations were sometimes controlled by Nature's own methods.

Myoclonic and Traumatic Epilepsy.

Dr. J. J. L. MUSKENS (Amsterdam) considered that it was possible to recognise at least two definite clinical entities among the many forms and variations that epilepsy might present.

1. *Myoclonic Epilepsy.*—The condition of myoclonic epilepsy consisted of the syndrome of headache, myoclonic jerks, and myoclonic fits—i.e., fits tantamount to genuine epileptic fits—whether these symptoms appeared in rapid succession or only after a lapse of years. In some cases headache might be the only symptom followed after some years, as many as ten, by myoclonic jerks, while again, after a lapse of years, "fits" appeared. In some cases the development of the complete clinical picture was more rapid, while in others the symptoms were not all present or varied greatly in severity. It was not until work involving the experimental administration of drugs such as camphor bromide demonstrated in the cat and the dog the close relationship between the tactile and acoustic myoclonic reflex and the complete epileptic fit. In the lower animals, as in man, the myoclonic jerks and epileptic fits merged into one another, while in both there appeared the same time of selection for the appearance of fits—viz., the time of transition from sleep to wakefulness, or from wakefulness to sleep. Among some 3000 epileptics Dr. Muskens had found several cases in which simple syncope was frequent just before the appearance of the fit, and transitional states between syncope and seizure were occasionally met with.

2. *Traumatic Epilepsy in Civilian Practice.*—From this class were excluded all cases in which there was merely a history of head injury but tangible trace of such either on X ray examination or as shown by the presence of a scar. Parents and friends often recalled some head injury in an endeavour to account for the seizures. Probably only 1 in every 200 cases of epilepsy was an instance of true traumatic epilepsy. In myoclonic epilepsy of long standing the motor cortex became hyperexcitable and even in traumatic epilepsy symptoms of the "genuine" disorder (e.g., myoclonic jerks) might develop. An important question was the type of patient that developed traumatic epilepsy after a cranial injury. From a careful analysis of cases, Dr. Muskens considered that persons suffering from gastro-intestinal disturbances had a predisposition to epilepsy. The arrest of fits he believed to depend mainly on the combination of general or hygienic treatment in "genuine" epilepsy with appropriate surgical treatment in traumatic epilepsy. Exact and careful regulation of life as regards food, drink, exercise, rest, fresh air, and habit of life was necessary; and care must be taken to avoid gastro-intestinal disturbance, especially constipation. Dr. Muskens desired to protest against the custom of classifying epileptics as (1) those who reacted to luminal or bromide, and (2) those who did not. Early and incipient cases, he considered, should not be given drugs as in many cases the disorder might be checked by a definite and exact hygienic mode of life.

Epilepsy a Cerebral Disease.

Dr. Gordon Holmes (London) regretted the selection of the title "epilepsies," as he considered that the same pathological basis underlay all types of epilepsy. Epilepsy was essentially a cerebral disease and the main factor was a liability of the grey matter of the brain to discharge or react by an epileptic seizure under the influence of physiological or pathological factors. The view that epilepsy was merely a

"metabolic dyscrasia" was, he considered, an hypothesis unsupported by any scientific demonstration. The absence of anatomical changes causally related to epilepsy was one of the main difficulties in understanding its nature, but the work of Foerster, Penfield, Fay, and others on the nature of local lesions that produced epileptic seizures promised to throw light on its pathology. On the other hand, it must not be forgotten that an organ might be normal in structure and abnormal in function. The most promising approach was through the systematic study of Jacksonian or local epilepsy. The positive and negative phenomena observed in local epilepsy might be seen in both the major and minor forms of the so-called idiopathic disease. Was the occurrence of the actual attack related to any definite cause? Probably the most important of these were the metabolic changes referred to by Dr. Wilson, but as far as he (Dr. Holmes) could see, the only trustworthy results were those of Lennox and Cobb—that alkalosis, anoxæmia, and excessive hydration predisposed to attacks, but they played probably only a subsidiary part by influencing the nutrition and functional activity of nervous elements predisposed to epileptic discharge.

Experimental Investigations with Thujone.

Dr. W. RUSSELL BRAIN (London) described certain experimental investigations with thujone—the convulsant constituent of absinthe—that he had carried out it conjunction with Dr. Riddoch. The thujone convulsion in the normal cat was a stereotyped reaction, with loss of consciousness, tonic and clonic elements, and involuntary micturition broods resembling an epileptic attack in man. In cats with a localised unilateral cortical lesion produced by cauterisation, the most striking feature of the thujone convulsion was a loss or reduction of the clonic element upon that side of the body opposite to the cortical lesion. The convulsions seen in the animal deprived of both cerebral hemispheres (the thalamus preparation) differed strikingly from those of the intact animal. Instead of clonic and tonic elements, there was seen a predominance of locomotor activity—running, crawling, and leaping associated with vigorous righting reactions. In the "decerebrate animal" (the upper portion of the mid-brain being removed as well as the cerebral hemispheres) the fits were predominantly tonic or postural in character, the commonest being an intensification of the prevailing extensor hypertonia. When the entire nervous system except the spinal cord was removed, the fits consisted of a riot of spinal activities—stepping, scratching, and excretory postures and movements following each other in rapid succession. When the spinal cord itself was transected in the dorsal reflex, the only response in the hind legs was increased reflex activity.

Dr. Brain regarded the majority of epileptics as possessing a constitutional predisposition to convulsions and many also exhibited a cerebral lesion which acted as a trigger to the charge. At one extreme there were doubtless cerebral lesions gross enough to cause convulsions in normal persons, and at the other a constitutional predisposition so marked that no trigger was required. Certain facts were accumulating regarding the hypothetical predisposition. Dr. Brain thought that the following facts were established: (1) The average blood cholesterol was lower in epileptics than in normal persons. (2) It was exceptionally low during status epilepticus and serial epilepsy. (3) It tended to be unstable in the neighbourhood of a fit. (4) In a number of cases it had been observed to precede a fit. There was also considerable evidence of some form of liver deficiency in epilepsy.

Three Classes of Epileptics.

Dr. DONALD CORE (Manchester) distinguished three classes of epileptic patients: (1) Persons otherwise normal who were liable to have isolated fits that symptomatically were epileptic. Such patient might never have more than one or two such attacks even in the entire absence of treatment. (2) Emotionally uncontrolled, nervous, worrying, introspective young men, patients who were continually on the verge of hyperthyroidism with its associated vasomotor instability. In these individuals the attacks were liable to occur in more or less well-defined settings—after trivial illness, slight accidents, periods of psychical stress, &c. They worried over their attacks and often enough in the free intervals they were more troubled by their non-epileptic psychical symptoms. (3) Those who showed no impairment of emotional control but rather tended towards mental dullness which varied from slight stupidity to a definite dementia. These patients were not worried by their condition unless the attacks were unusually frequent and there may be a family history of epilepsy. From the standpoint of treatment these three groups were poles apart, and what might be a proper line to follow in one might be disastrous in the others.

The first group required no treatment at all and the less they were brought into a medical atmosphere the better. Those of the second group required emphatic reassurance that the occasional occurrence of an epileptic attack had in their case no serious significance. As far as possible they should have their thoughts directed to the morbid effect of worry in their lives rather than the effect of the attacks. They should be encouraged to live their customary lives and to avoid any restriction of their pleasures and enjoyments. Such sedative treatment as might be prescribed need not be continued for any length of time. To a certain extent the same principles of treatment applied to the third group of cases but in these drug treatment was of greater though not of the greatest importance. The most important element of treatment was to prevent the patient from looking upon himself as an outcast. If the mental dullness was such as to prevent even the semblance of a useful life in home surroundings, then he should be sent into an epileptic colony where it was normal to be epileptic and where he had a certain definite routine of life.

The Emotional Factor.

Dr. E. L. FOX (Plymouth) mentioned the importance of recognising the psychogenic origin of idiopathic epilepsy; he considered that in studying the history of cases of epilepsy the close analogy of the emotional characteristics of the epileptic with those of the hysteric was almost invariably forthcoming. He instanced cases in which repression was apparently an important factor in the causation of epilepsy and in which the attacks ceased on the repressed incident being recalled. Dr. Fox advocated the endeavour to raise the level of the emotional standards in all epileptics so that they could more readily resist the attacks.

Sphenoidal Sinusitis and Epilepsy.

Dr. F. A. PICKWORTH (Birmingham) demonstrated slides of a series of four cases of epilepsy of differing duration, all of which showed evidences of sphenoidal sinusitis and infection of the pituitary gland. He drew attention to the large proportion of epileptics in mental hospitals, and brought forward evidence indicating that epilepsy, as well as insanity, might be due (1) to an extension of sepsis from an infected sphenoidal sinus along the course of the carotid artery producing the minute focal areas of brain necrosis found in epileptics, and (2) extension through the pituitary gland to the area of the brain immediately above it which subserves vital metabolic processes especially affected in epilepsy. He emphasised the necessity of a careful examination, hitherto much neglected, of the sphenoidal sinus and pituitary gland in necropsies of epileptics.

Diet in Epilepsy.

Dr. TYLOR FOX (Lingfield) briefly outlined his experience of the ketogenic diet in five cases of epilepsy. He had found this, as had American observers, to be most effective in cases of petit mal.

He expressed the hope that others who were experimenting with the diet would publish their results.

Dr. A. MACDOUGALL (Manchester) spoke of his experiences at the David Lewis Epileptic Colony as regards the general character and temperament of epileptics.

The PRESIDENT referred to the well-known influence of intercurrent maladies on epilepsy, especially the amelioration, suspension, and even cessation of seizures following measles and other diseases. If the cardinal factor in the pathology of epilepsy was an instability of the cerebral neurones, then the cessation of fits indicated that the neural mechanisms had become more stable. It seemed probable that such restoration was the result of biochemical changes rather than of vascular or other extraneural factors. Following this line of thought—viz., that there was present a perverted metabolism—the question of diet needed further investigation. Various diets had been tried and the beneficial effect of fasting in some cases had led to the adoption of a ketogenic diet. Dr. Bury had been much impressed by the results of the lævulose-tolerance test in epilepsy—indicating some definite liver deficiency, and also by the investigations on blood cholesterol. Reflecting on the pathological changes in the liver in pernicious anæmia and the wonderful results of liver treatment in that disease, the President ventured to suggest that it would be worth while supplementing the diet of epileptic patients with minced liver.

SECTION OF VENEREAL DISEASE.

LESIONS OF LATENT SYPHILIS.

Colonel W. COATES, President of the Section, opened the session with an address on the history of venereal disease, and the ideals which were to be aimed at in modern treatment. The section was then addressed by Prof. A. S. WARTHIN (Michigan). He said he had made a study dating from 1906 of the histological lesions of latent syphilis in relation to the presence in these lesions of the *Spirochæta pallida*. He first used the Levaditi method of staining, but later, with the aid of Dr. Starry, he perfected the Warthin-Starry method which reduced the time of staining and resulted in a greater percentage of positive spirochæte findings. His material was derived from necropsies conducted on patients drawn from the whole State of Michigan, who were chiefly of the lower middle classes in the small towns and rural districts. The percentage of syphilis in this material he found to be very high, varying in different years from 30 to 60 per cent.

According to Prof. Warthin's observations, in the *leptomeninges* the lesions of latent syphilis occur very frequently, though varying in intensity, and are usually found over the sulci of the parietal and frontal lobes. The more active lesions show localised areas of a mild proliferative process with slight infiltration of monocytes, plasma, and lymphoid cells, the milder lesions being of a more sharply localised character. Every stage of severity is found from the slight fibrosis of the meninges to the typical form of syphilitic meningitis. In the brain localised perivascular infiltrations occur, mostly in the frontal and parietal lobes; they are usually few in number and vary in intensity. Otherwise it may be said that the latent syphilitic has lesions identical with those of the paretic. In both the meninges and the brain the incidence of these lesions is greater in the male than in the female.

In Prof. Warthin's experience the *heart* of every male latent syphilitic shows latent lesions varying from small areas of infiltration to the more diffuse areas of interstitial myocarditis. Though the incidence of these cardiac lesions of latent syphilis in women is small, in some women the more severe forms of syphilitic myocarditis do occur. The part of the heart usually involved in latent syphilis is the septum and the anterior and posterior walls of the left ventricle, near the apex. The lesions are intramuscular rather than perivascular and of a diffuse character. A characteristic feature is the increase of nuclei beneath the endocardium, the cells lying in two to five rows closely crowded together. Œdema of the stroma is found, being the more marked with the more active lesions. Fibrosis of the stroma results, with fatty degeneration and atrophy of the muscle fibres, though between the patches of infiltration hypertrophic muscle fibres are often seen. The aortic valve alone is commonly involved, and this through the vasa vasorum. Macroscopically, the heart of the latent syphilitic usually shows dilatation of the left or both ventricles; there is usually no valvular lesion, except in younger subjects in whom latent syphilis appears to predispose to bacterial endocarditis. In life these cases of latent cardiac syphilis show signs of myocardial insufficiency, and the common clinical diagnosis is that of "rheumatic heart." The condition is progressive and cardiac death is frequent in the male.

Latent active lesions are to be found in the *aorta* of all male, and in the majority of female, syphilitics. The lesion is essentially a disease of the vasa vasorum, which become thickened and obliterated; the term "mesaortitis" is a misnomer. This results in a slow infarction of the intima and part of the media, with sclerosis and atrophy of the muscle and degeneration of the elastic tissue. The syphilitic character of these lesions can only be determined by microscopical examination. Syphilis of the aorta exists in three forms: with aneurysm, with aortic insufficiency, and with lesions of the vasa vasorum alone. The latter is the most common; it may be symptomless, or give the syndromes of aortalgia, or even angina pectoris. Aneurysms are generally produced by local weakening of the walls due to miliary gummata along the vasa vasorum. Spirochætes in small groups can be demonstrated by the improved starch-gelatin modification of the Warthin-Starry method.

In both sexes the *liver* is usually the seat of latent syphilitic lesions. They consist of infiltrations of the periportal tissue, leading to fibrosis and some hepatitis. All stages of severity exist up to the severest form of cirrhosis (hepar lobatum), which latter condition is more frequent in women than in men. The percentage of liver involvement appears to be on the increase, particularly in the cases which have received modern arsenical treatment. Spirochætes are more difficult to demonstrate in the liver than in any other organ, usually being found only in small numbers and in the active areas of infiltration.

Lesions of latent syphilis are common in the *pancreas* though usually mild; they take the form of an interstitial pancreatitis not arising from the ducts. The intralobular stroma is increased and the islands may become fibroid. He has found this condition the most common cause of diabetes in his diabetic cases.

In the *adrenals* latent syphilitic lesions are more severe in women than in men. In the majority of cases they do not produce signs of adrenal insufficiency, yet they may be severe enough to cause marked atrophy and fibrosis, giving a typical clinical picture of Addison's disease. The spirochætes are easily shown in the cellular infiltrations, but in small numbers.

The *testis* of every latent syphilitic shows sooner or later patches of interstitial orchitis, with atrophy of the germinal epithelium and fibrosis of the basement membrane of the tubules. An early loss of spermatogenetic function occurs in the majority of cases.

Prof. Warthin has never found a syphilitic lesion in either the *ovaries* or the *Fallopian tubes*. The spirochæte has been demonstrated in the ovary in congenital, but never in acquired, syphilis. This suggests a local tissue immunity of the organ. Lesions have been found in the endometrium of the *uterus*, extending into the uterine wall.

It is true, he said, that the latent syphilitic presents a high percentage of *pulmonary fibrosis*. Only rarely, however, can the spirochæte be demonstrated or gummata shown to be present. He had only encountered 15 cases in which the presence of pulmonary syphilis was positively proved, the majority of these

cases being associated with gummatous lesions, the remainder being cases of Ayerza's disease.

In conclusion, Prof. Warthin pointed out that the lesion of latent syphilis repeats the essential pathology of the hard chancre and of the secondary and tertiary lesions of active syphilis, being predominantly vascular and perivascular, and the infiltrations being derived from the proliferation of cells in situ. He had never seen at necropsy a case of perfectly healed syphilis, a statement which was as true of cases treated in the modern manner as of cases treated by the old mercurial method; the more evident difference was the greater frequency of chronic hepatitis in cases treated by the arsenical method. What the treatment did accomplish in either case was the more rapid reduction of the average active case to a state of latency. The latency of the infection might last throughout the individual's life or at any time exacerbations might take place, and the disease rise above the clinical horizon; what determines these exacerbations was yet to be learnt. Whether a five years' period of treatment would finally rid the body of spirochætes he could not say, for no more than three years' treatment had been given to the cases from which he derived his material.

Discussion.

The discussion was opened by Sir HUMPHRY ROLLESTON, who commented on the magnificent slides which Dr. Warthin had exhibited. He asked whether the spirochætes in the slides had been proved to be the *S. pallida*. The incidence of latent syphilis would appear to be very high. Could a patient never be deemed free from syphilis until the pathologist's verdict at necropsy had been obtained? If both early and late treatment were given, could not these cases be prevented from becoming latent? What was the relation of the Wassermann reaction to latent syphilis?

Colonel L. W. HARRISON appealed for a more optimistic view than that presented by Prof. Warthin. He wondered if Dr. Warthin's cases were drawn from a highly syphilised population where old methods of treatment had been in vogue. He could not agree that the arsenical preparations were merely immunising agents; he considered them to be definitely spirochæticidal, as instanced by the rapid disappearance of certain specific lesions after even one dose of intravenous arsenic. He further understood that tissue transplantation from infected animals after they had received early arsenical treatment did not transmit the disease. He was strongly of the opinion that arsenobenzol was useful in the treatment of cardiovascular lesions, when it was skilfully exhibited.

Prof. G. LORRAIN SMITH asked whether Dr. Warthin had examined the skeletal muscles of his cases. Did the *S. pallida* act on the organism by means of a toxin or by the effects of local tissue reaction—for example, the perivascular changes?

Dr. DAVID NABARRO said that in 14 years at Great Ormond-street he had decided that the diagnosis of congenital syphilis was by no means simple. The signs were often latent, and diagnosis was particularly difficult after the first few weeks of life. He gave a comprehensive review of the clinical manifestations of congenital syphilis and showed X ray pictures revealing abnormalities in the skeleton which were not otherwise apparent.

Dr. DAVID LEES asked whether Prof. Warthin had examined any cases which had been treated with malaria. He agreed with Colonel Harrison that cardiac conditions benefited from careful treatment with arsenobenzol. Could Dr. Warthin explain the absence of the *S. pallida* in the ovaries and the tubes? He had observed that a positive W.R. generally became negative with the onset of the menopause. He further asked whether the *S. pallida* were alive or moribund in the sections which had been shown.

Dr. E. TYTLER BURKE thought that the results obtained by Dr. Warthin might be due to incomplete treatment. He was not satisfied that there had been early and persistent treatment. He thought that the amount of syphilis in this country was greatly underestimated; he put in a plea for the more adequate teaching of venereology in the medical schools and among post-graduates.

Dr. H. M. HANSCHELL stated that he had been staining slides by the Levaditi method and had found them unsatisfactory. In his experience syphilitics did not complain of early loss of sexual desire. He suggested that the word "fenced" be used instead of latent or dormant, indicating that the *S. pallida* in these cases was fenced by fibrosis from the drug. He recommended excision of the primary lesion (and even in some cases of accessible indurated lymphatic glands) where the condition did not clear up readily under the influence of arsenobenzol. He could not too strongly emphasise the importance of early and thorough treatment.

The PRESIDENT, in calling upon Prof. Warthin to reply, said that he had been reluctant to admit that cases of second primary infections could occur, though he had had cases which strongly suggested this phenomenon. Many years ago he had practised excision of the primary chancre, but he had come to the conclusion that this had no influence on the course of the disease.

Reply.

Prof. WARTHIN, in reply, stated that the spirochætes in question had been inoculated into rabbits with the production of typical syphilitic lesions. He reiterated that in all of his cases he had never seen a complete cure; there were latent lesions in all of them. Latent syphilis was really a high grade immunity. He concurred with the contention that arsenobenzol was spirochæticidal, but he would emphasise that its practical effect, along with other antisyphilitic remedies, was the production of immunity. He considered that a strongly positive W.R. indicated active syphilis, with certain exceptions, such as widespread malignant disease, chicken-pox, and miliary T.B. He considered that a negative W.R. was of no value whatever. He could not agree with Col. Harrison that he was a pessimist. He admitted that his cases were drawn from a highly syphilised community, but many of his cases had been treated for three years according to modern methods. He considered that it would only be useful to treat early cardiovascular conditions with arsenobenzol, since old lesions could not be cured. He had not examined the skeletal muscles of his cases. He believed that the *S. pallida* acted by local tissue reaction rather than by a toxin. He could not explain the local tissue immunity of the ovaries and tubes, though many theories had been put forward. To Dr. Lees he replied that a moribund spirochæte was always fragmentary. He did not think that extirpation of the primary chancre could make any difference to the progress of the disease. With reference to second primary infections, it was to be remembered that animals becoming immune to one strain of *S. pallida* could be infected with another strain. It was highly probable that the same results obtained in human beings.

A number of microscopical slides prepared by Prof. Warthin were open for inspection in the Pathological Museum.

SECTION OF ANÆSTHETICS.

Dr. A. L. FLEMMING (Bristol) presiding, Dr. H. P. FAIRLIE (Glasgow) read a paper on

Ethylene and Oxygen Anæsthesia.

He said that the proportion of ethylene gas to oxygen was usually about 88 per cent. ethylene to 12 per cent. oxygen, but varied according to the age and build of the patient, the condition of heart and lungs, and the nature of the operation, the oxygen percentage always being maintained at such a level as would prevent respiratory failure; more than a slight degree of cyanosis was regarded as a danger sign. If this point was remembered the anæsthetic was perfectly safe. Dr. Fairlie himself arranged for re-breathing, using the same apparatus for ethylene

administration as for nitrous oxide and oxygen. As far as safety, rapid action, and immunity from ill effects were concerned ethylene and oxygen anæsthesia resembled nitrous oxide and oxygen. There were, however, two points of difference, the first being favourable to ethylene in that a deeper anæsthesia was obtained. In Dr. Fairlie's experience some cases did better with ethylene and oxygen anæsthesia than with a nitrous oxide anæsthesia. The second difference was the very disagreeable smell of ethylene gas, which affected the other occupants of the operating theatre more than the patient. He was in the habit of having his gas made up with oil of eucalyptus and had never had any complaints from the patient.

Dr. Fairlie reviewed the advantages of ethylene from the points of view of the patient, the surgeon, and the anæsthetist. The patient did not experience disagreeable sensations; he lost consciousness rapidly without showing resentment or excitement, and though vomiting occurred in about 75 per cent. of cases it was within a minute or two of the end of the administration. No unpleasant taste remained. The surgeon was satisfied with the anæsthetic in all cases except those in which much relaxation was required. The anæsthetist was provided with a safe anæsthetic with a large margin of safety, and had ample warning of any impending danger. Dr. Fairlie alluded to the inflammability of ethylene gas and the precautions necessary in using it.

The PRESIDENT asked for information on the margin of safety.

Dr. K. B. PINSON (Manchester) in his dental work had found ethylene successful in some patients where nitrous oxide had failed, and had been disappointed in the results in other patients. He advocated the use of ethylene in old and feeble patients and in those who were very ill. He suggested that its safety was due to the amount of oxygen employed, and did not consider the smell a contra-indication.

Dr. C. F. HADFIELD (London) referred to the work of Prof. H. B. Dixon and the intense importance to the anæsthetist of the flash point and ignition point of gases. The smell of ethylene gas was not due to impurities.

Dr. H. E. G. BOYLE (London) read a paper on

Gas and Oxygen in Midwifery.

He said that he had always regarded chloroform as a dangerous and toxic drug to give a woman at childbirth, and stressed the advantages of nitrous oxide and oxygen anæsthesia, which had been made familiar to him by Dr. Wesley Bourne of Montreal. He said that the patient was given nitrous oxide and oxygen with every pain and learned to ask for the mask, since the anæsthetic diminished the pain. Owing to the fact that the gas was non-toxic it could be given for a long time without harm to mother and child provided there was no cyanosis. The anæsthetist could greatly reduce the work of the obstetrician, since he need not send for him until about one hour before the child was born. Another advantage was that the patient could be completely anæsthetised if ether was added when the head was on the perineum: when the head was born the gas and ether were shut off and carbon dioxide and oxygen (1 in 6) given, with the result that the mother's respiration was increased and the child became a rosy pink and "gave tongue." The anæsthesia could be deepened again for the delivery of the placenta. Patients in his experience recovered consciousness very quickly. He cited as disadvantages the fact that a special anæsthetist who was familiar with the method had to be present, and that special apparatus had to be used; for these reasons also the cost was greater. His impression was that the pains were not slowed but were rather increased in frequency and in strength where plenty of oxygen was used, and patients were certainly less exhausted and recovered more quickly than when choloroform was used. He emphasised the importance of avoiding cyanosis.

In the discussion that followed Dr. R. C. MOTT (Burslem) said that he saw no objection to giving gas and oxygen throughout the labour. Dr. E. F. HILL (Manchester) objected to the method on the score of expense and suggested that labour pains should be mitigated by means of chloroform given with a Vernon-Harcourt inhaler.

Dr. F. P. DE CAUX (London) then read a contribution on

Glucose—Why, When, and How to use it.

as an antidote to the shock of operation and anæsthesia. He described the mechanism of its working according to Mr. J. McDonagh's theories. He advised the use of 15 to 20 units of insulin two hours after the injection of glucose.

He recommended that glucose should be given before a severe operation, when liver efficiency was suspected, when the basal metabolic rate was high, as in Graves's disease, and when the patient was emaciated or under-nourished. Glucose should always be given after operation when a blood transfusion was impossible and after any anæsthetic where the patient showed signs of shock; where glucose had not been given before; where the surgical manipulation had been rough; when more anæsthetic had been used than usual; and when there was a history of epilepsy.

A discussion followed in which Dr. FAIRLIE, Dr. HILL, and Dr. MOTT took part.

Dr. WINIFRED WOOD (Edinburgh) read a paper on

Rectal Ether Oil Anæsthesia, with Special Reference to Brain Surgery.

She had used in over 70 cases a modification of the technique devised by Dr. J. T. Gwathmey of New York, who had closely investigated the properties and the action of ether in oil. The safety of this type of anæsthesia was the reason for its employment in cases of bad surgical risk and she cited certain operations in which it had been chosen. She pointed out its application to severe and prolonged operations in brain surgery. The method had three advantages in brain surgery: (1) access to the patient's face was not necessary; (2) the dose of ether was smaller than in an inhalation anæsthesia; (3) by reason of the sleep-like quality of the anæsthesia the administrator was free to take observations on blood pressure, pulse, and respiration, which formed a valuable guide to the condition of the patient and to how far operation might proceed. She gave a brief account of the technique employed, pointing out that the procedure in general surgery and brain surgery was different owing to the fact that morphia was strongly contra-indicated in the latter. The anæsthesia produced by rectal ether was very light and might have to be supplemented by inhalation ether vapour in certain cases.

Dr. Wood discussed the action of rectal ether from the physiological aspect, referring to its slight effect on blood pressure even after many hours administration, and the relative absence of disturbance of the acid-base balance. Difficulties might arise from the pre-existing intracranial tension and the hæmorrhage during operation. With this type of anæsthesia there was generally a good convalescence with none of the complications usually ascribed to the anæsthetic. The long period of sleep after operation was an asset. Notes of brain operations on middle-aged and elderly patients which lasted from three and a half to six and a half hours were given to show the satisfactory condition of the patient during and after operation, even when hæmorrhage was so severe as to necessitate blood transfusion on the table.

Dr. S. THOMSON ROWLING (Leeds) read a paper on the

Scientific Administration of Anæsthetics

and demonstrated his modification of Clover's inhaler, along with the anæsthetic table which is designed to supply oxygen, nitrous oxide, and carbon dioxide in any percentage combination with or without chloroform vapour of definite strength. Describing the nervous, circulatory, and respiratory depressions that arise from anoxæmia, and in which apnœa plays a part, he stressed the importance of the use of oxygen

and carbon dioxide together during an anæsthetic. He believed that all dangers of anæsthesia, operative and post-operative, could be prevented by the administration of an anæsthetic with this apparatus, which provided for a percentage of ether, oxygen, and carbon dioxide according to the patients' requirements. Dr. Rowling quoted cases to show the good results obtained.

Reviews and Notices of Books.

Recent Advances in Pulmonary Tuberculosis.

By L. S. T. Burrell, M.A., M.D. Cantab., F.R.C.P. Lond., Senior Physician to the Royal Free Hospital; Physician to Brompton Hospital for Consumption and Diseases of the Chest. London: J. and A. Churchill. 1929. Pp. 217. 12*s*. 6*d*.

In the preface of his book Dr. Burrell states that he has "tried to describe the recent increase in our knowledge of tuberculosis, and to separate the real advances in treatment from those methods which have no scientific basis, and enjoy but brief, though occasionally recurrent, phases of popularity." In this attempt he has been most successful, and his book will be read with profit not alone by those who are specially interested in diseases of the chest. It is illuminated throughout by a common sense not always exhibited by those who write on tuberculosis, and this is a virtue which will be appreciated by the general practitioner. In discussing scientific theories, Dr. Burrell knows how to compress his matter without losing the interest of his reader, and his explanations are always lucid. A chapter on radiology is illustrated by a series of skiagrams provided by Dr. Stanley Melville. These are well produced and should demonstrate the supreme value of this means of diagnosis to those whose opportunities for studying radiograms are limited. Seven of the 12 chapters are devoted to the treatment of pulmonary tuberculosis and its complications. Adequate nourishment, rest, and fresh air remain the most generally effective methods for combating the disease, and Dr. Burrell's grasp of essentials is well illustrated in his references to these. Modern methods of treatment are designed to supplement and not to supersede treatment on sanatorium lines. The uses and limitations of sanocrysin are well summarised in a short chapter which is followed by one fully describing artificial pneumothorax. In the next edition of the book the sections on operative treatment by thoracoplasty and other surgical methods might be expanded, since recent advances in thoracic surgery are noteworthy.

Handbook of Physiology.

Eighteenth edition. By W. D. Halliburton, M.D., LL.D., F.R.C.P., F.R.S., and R. J. S. McDowall, M.B., D.Sc., F.R.C.P. Ed. London: John Murray. Pp. 902. 18*s*.

Though the young medical student may be content to borrow from a library a large tome on anatomy and supplement it by short dissecting manuals, he usually buys his first text-book of physiology. It is therefore this work which he opens eagerly in the first evenings of October, feeling that by getting ahead of his lectures he can prepare himself to enjoy them and to take notice rather than notes of the spoken instruction. It must be confessed that his first reaction is generally one of disappointment. In the elementary form in which they are presented to the medical student, chemistry, physics, and biology seem fairly concrete and established sciences. Of the gross and minute structure of the body, too, more is apparently known with precision than he can ever hope to acquire in two years' of study. In physiology, however, when he seeks information on subjects which may interest him—for example, the meaning of sleep, the exact functions of the liver which are deranged in a "bilious attack," the mechanism of secretion of urine—he finds that these phenomena are still largely in the realm of theory. He begins to wonder how he is going to grapple with the subject, for there is nothing more difficult to remember, and especially to reproduce, than an argument involving the examination of many theories mutually contradictory and each founded on experiments which in themselves seem reasonably conclusive. It is no wonder that the student turns to the dissecting room for relief, though the relief may change to despair when he persistently fails to discover those cutaneous nerves which in the pictures protrude so convincingly through the superficial fascia. He has to learn that his days of simple acceptance of facts imparted by a teacher are over and his duty henceforward will be critically to examine and then to assimilate such knowledge as has been gained painfully by observation and experiment. It is largely through the medium of his first text-book that his attitude to physiology and ultimately to medicine will be formed, and to strike the mean between too much simplification, which will only postpone the difficulties, and too much complexity, has been the task successfully accomplished during many years of active teaching by Prof. Halliburton. It is thus a pleasure to see that this Handbook of Physiology has been reissued after four years in a renewed form. In the preparation of this eighteenth edition Prof. Halliburton has had the collaboration of Prof. McDowall who succeeded him in the chair of physiology at King's College, London. Prof. McDowall has contributed several new chapters and has rewritten others. That on the nervous system has been brought up to date and an account of postural and conditioned reflexes has been included. Sections on the autonomic nervous system, speech, the control of the circulation, carriage of carbon dioxide, maintenance of body neutrality, the vitamins, ductless glands, and intermediate metabolism are also for the most part new, while recent work on the formation of blood and the bile, on the spleen, on the control of respiration, and on test-meals, has been added. To admit all this new material anatomical detail has been reduced, but essential anatomy and histology are retained. There are now more good text-books of physiology than there were 30 years ago when Prof. Halliburton first took charge of a work which had maintained its vitality for half a century, since it originally appeared in 1848 as Kirkes's Physiology. We seen no reason why this edition should not be as popular as its many predecessors, and we trust that Prof. Halliburton's name may for long be associated with its further progress.

American Chemical Society Monographs.

Thyroxine. By Edward C. Kendall, M.S., Ph.D., D.Sc. The Mayo Foundation, Rochester, Minnesota. New York: The Chemical Catalog Company, Inc. 1929. Pp. 265. $5.50.

Biochemistry of the Amino-Acids. By H. H. Mitchell, Professor of Animal Nutrition, College of Agriculture, University of Illinois; and T. S. Hamilton, Associate in Animal Nutrition of the College. Same publishers. 1929. Pp. 619. $9.50.

The appearance of Kendall's book, which was announced some years ago, has been delayed in order that the author might first bring to a conclusion his work on the constitution of thyroxin. It is mainly concerned with the chemical nature of the thyroid gland and its secretion, and forms one of the monographs issued by the American Chemical Society. In the last few months of 1914 Dr. Kendall's persistence in pursuing a long and tedious series of researches was rewarded by the isolation of a substance which he named thyroxin. Since the physiological activities of the whole gland are centred in this crystalline substance its isolation has extended our knowledge not

only of the internal secretions, but also of the nature and regulation of life-processes in general. Dr. Kendall says in the preface: thyroxin bridges the gap between living protoplasm and the expression of what may be called personality or temperament, and has a definite place in the study of normal and abnormal mental processes.

Since the discovery by E. Baumann in 1895 of the remarkable fact that iodine was a normal constituent of the thyroid gland, attempts have been made to find a reason for the presence of this element and to determining the chemical nature of the particular compound in which it is involved. Baumann showed that acid hydrolysis gave a substance which he called thyreo-iodin or iodothyrin, which contained a very large proportion, about 10 per cent., of iodine, and which had the same action as desiccated thyroid when given to patients suffering from either hypothyroidism or from goitre. A few years later, in 1907, Nürnberg showed that the two amino-acids, tyrosine and tryptophane, were essential constituents of iodothyrin. Nürnberg used the process of digestion with barium hydroxide in the preparation of his material, and therefore in two important points he anticipated the results which Kendall and C. R. Harington were later able to achieve. Unfortunately, Nürnberg discarded the insoluble fraction resulting from the digestion, and it was this fraction, as Kendall showed later, that contained the thyroxin. The advances made in the next few years were slight, and it was not until 1914 that Kendall's researches led to the isolation of the crystalline substance from sheeps' thyroid. The author's early experiments make fascinating reading. After three years' steady work seven grammes of the compound had been accumulated from a vast quantity of the gland substance. The crystalline structure and the physical and chemical properties were described, and several derivatives were prepared. Acting on the belief that the compound was a derivative of indole, possibly from an iodised tryptophane precursor, Kendall and Osterberg suggested a probable formula which the work of Harington during the last four years has shown to be incorrect. Great credit must be given to Kendall for the modest manner in which he refers to this work. Harington, in a series of monumental researches, has shown beyond doubt that the constitution of thyroxin is really that of an iodised derivative of tyrosine and not of indole or tryptophane. The difficulty of the problem was bound up with the presence of the iodine in the organic molecule; Harington described in 1906 how he first reduced thyroxin, thus preparing the iodine-free parent substance which was eminently suitable for chemical work. In this way it was first definitely established that the iodine free compound, and hence probably thyroxin itself, was a derivative of tyrosine. Harington then synthesised the iodine-free compound, and a year later, working with G. Barger, published the synthesis of the tetra-iodo compound and proved that this substance was chemically identical with thyroxin, and also increased the basal metabolic rate to the same extent. By a remarkable coincidence Dakin had also discovered that thyroxin may be made to yield tyrosine, but on hearing of Harington's much more complete results he withdrew his manuscript from the press.

These recent advances are of such interest that they have properly occupied a great deal of the space available of this book, though they constitute only a portion of its contents. The remainder deals adequately with the influence of the thyroid gland on hypothyroidism, on the metabolism of carbohydrate nitrogen, phosphorus and calcium and on the distribution of water, on the nervous system on growth, and on the basal metabolic rate. Other sections describe the standardisation of the hormone and its influence on amphibian metamorphosis. The concluding chapters of the book describe the relation between the histological appearance and the activity of the gland, some clinical aspects of thyroid disease, and finally the effect of thyroxin on some biological oxidations. The bibliography contains 541 references.

Prof. Mitchell's work is one of the same series of monographs. The biochemistry of the amino-acids is complicated, and the authors have set themselves a difficult task. In the first place, it is not easy to draw a line between the pure chemistry and the biochemistry of the amino-acids, and wherever an author attempts to draw this line he is liable to criticism. For instance, although in the first chapter the chemical properties of the amino-acids are described in fair detail, there is practically no indication of the synthetic work that has been done in building them up into peptides. The sketchy account of this important achievement is unsatisfactory, though admittedly an adequate presentment would have taken up much space. The next chapter, dealing with the determination of amino-acids in proteins, gives a full and critical description of all the best known methods employed, with an exhaustive review of the literature of the subject. This is followed by an equally detailed section on the individual amino-acids; a series of tables give the amino-acid content of different proteins as determined by various methods, a reference being given to each figure quoted. The fourth chapter, on the liberation of the amino-acids in the intestinal tract, is followed by three chapters devoted to amino-acid metabolism. Their specific dynamic effect is next considered, and the final chapter of the book deals with the value of proteins from the point of view of nutrition.

A fine piece of work and a valuable contribution to biochemical literature.

BOOKS FOR NURSES.

Gynæcology for Nurses. Fifth edition. By COMYNS BERKELEY, M.A., M.D., M.C. Cantab., F.R.C.P. Lond., F.R.C.S. Eng., Gynæcological and Obstetric Surgeon to the Middlesex Hospital, &c. London: Faber and Faber, Ltd. 1929. Pp. 426. 7*s.* 6*d.*

FOR nearly twenty years this has been one of the most popular text-books for nurses in the English language. The fifth edition has been extensively revised, and in parts rewritten; the author notes that revision has been greatly aided by suggestions sent by sister tutors throughout the country. New matter has been added with reference to X rays, radium, blood transfusion, and the modern methods of treating syphilis. The book owes its popularity to its simplicity, its clearness, and its dogmatic teaching. The author never forgets that he is writing for nurses and not for medical students.

The Nurses' Handbook of Hygiene. Second edition. By L. E. H. WHITBY, M.A., M.D. Cantab., M.R.C.P. Lond., D.P.H., Assistant Pathologist, Middlesex Hospital. Same Publishers. 1929. Pp. 163. 4*s.* 6*d.*

THE second edition of this handbook, while it occupies approximately its former bulk, has been brought up to date in most of its sections, particularly in relation to vitamins and food preservatives. It suffers from the defects common to books which attempt to cover a very wide range of subjects in an elementary fashion. For instance, ventilation is discussed at considerable length without reference to the katathermometer, although the estimation of carbon dioxide is given as a measure of ventilation; standards for metallic impurity of water are mentioned, but the importance of chlorine and ammonia is only noted in general terms. The designation "Grade A. Certified," in relation to milk, does not exist. The connexion of summer diarrhœa, diphtheria, and typhoid fever with contamination of the atmosphere of houses by sewer air would not now be generally accepted. The author's views on the milk problem are of interest; his suggestion that milk from tubercle free herds should always be boiled will not meet with general acceptance. These points are noted because, on the whole, the book is a useful guide, and nurses will find therein most of the information on hygiene which they will need for examination purposes.

THE LANCET.

LONDON: SATURDAY, SEPTEMBER 14, 1929.

A NATIONAL MATERNITY SERVICE SCHEME.

In reviewing the vital statistics for 1928 last week we had to record that the maternal death-rate for that year (4·42 per 1000 live births) offered little scope for optimism, being the worst on record since 1911. A more hopeful outlook for the future is to be anticipated since the adoption by the British Medical Association of a scheme for a National Maternity Service which is based on sound lines and may lead to important legislation. It is proposed to utilise the services of general practitioners and midwives with as little additional machinery and institutional accommodation as possible, and it could therefore be brought into action in a reasonable period of time with the minimum dislocation of existing conditions of practice. The principles on which this scheme, which was outlined in THE LANCET of July 27th (p. 195), is based are that normal maternity cases can be safely treated at home, and that mortality and morbidity can be greatly reduced by proper care and supervision during the antenatal, natal, and postnatal periods. The cost of the scheme, calculated at £2,100,000, could be met on a compulsory national insurance basis, which would include at once all women entitled to maternity benefit; others in a similar economic position could be brought in by further administrative action, leaving only the small percentage working on their own account to come in on a voluntary basis. The additional contribution to meet the services outlined is reckoned at 0·4*d.* a week from the employer and insured person, made up to 0·6*d.* by the State. Against this could be set some saving to the State and local authorities in the shape of fees paid to doctors called in by midwives and lessened costs of clinics. A medical practitioner and midwife would be provided for all pregnant women under the insurance scheme. Antenatal care would be shared by both, the midwife keeping the patient under close supervision. The doctor would examine her at least once, determining whether her labour can be left to the midwife, and would respond to the call of the midwife throughout pregnancy, labour, and lying-in, if required. The doctor would see every patient and, if necessary, make a pelvic examination, before she returns to work. Additional material and service allowed for in the cost include payment for hospital accommodation for cases unsuited to delivery in their own homes, sterilised dressings, ambulance facilities, and another practitioner when required for consultation or administration of anæsthesia.

A system of this kind, by which attendance on the normal is left to the midwife with medical supervision and assistance in the case of abnormality, has been widely advocated as the one most likely to lead to a lower maternal death-rate. Briefly, the reasons given in support of it are that mortality is lowest in those countries where such a system prevails—e.g., Scandinavian countries, Holland, Italy; that the best results in this country are obtained under this system, as in the midwifery service of the Queen's Institute, hospital and other maternity districts; that as soon as it is recognised that the first object in midwifery is to maintain the normal throughout childbearing it is needless to use the more highly trained medical services for attendance—often prolonged—on natural labour, if a midwife with a doctor on call will suffice. The British Medical Association has now accepted this view, has brought out a scheme embodying the methods of institutional practice, and has shown how the change can be effected by improving and using in a different manner the existing machinery. That the scheme brought forward by the Council was adopted by the representative meeting with only minor emendations after a brisk discussion justifies the agitation on maternal mortality, for five years ago acceptance of the scheme now outlined would have been almost unthinkable. That there would be difficulties and disappointments in its initial stages is certain, for the results obtained in hospital districts cannot be expected at first, since institutions have a tradition behind them as well as a carefully selected and skilled personnel. Even if the patients attended by the Queen's Institute are in some degree a selected group, the results obtained by its midwives with medical aid provided by local practitioners are sufficient to show that the system of working is itself the most important factor, and one would expect that a national service of the kind envisaged by the Association's memorandum would soon approximate to the Queen's Institute figures. One question that must be left unanswered is how the insured women would behave under it. Would they demand more of the medical services than the scheme has provided for? Previous experience of women under the National Health Insurance Act suggests doubts as to the possibility of making any accurate estimate.

In a paper that appears elsewhere in this issue, Mr. GIBBERD gives figures from Guy's Hospital district which point in the same direction as those from the Queen's Institute and the institutional district practices in London, Liverpool, and Scotland, quoted in the appendix to the Association's memorandum. Though in Guy's Hospital district attendance is divided between medical students and midwives the system of working is the same. In order to make his cases an average sample of the general population and render his figures more comparable with the national, Mr. GIBBERD has included all patients domiciled in the area of the hospital, whether delivered at home or transferred to hospital. He omits, however, to draw attention to the fact that his figures are not strictly comparable to the national figures, because his are based on 1000 deliveries and the national ones on 1000 live births, and his figures exclude deaths due to early abortions and other conditions in pregnancy not falling under the ordinary work of a maternity district. These points, however, in no way invalidate his interesting comparison of the two periods under review, and he is able to show what the national returns have been unable to show, and that is a remarkable drop in the maternal death-rate. In the last ten years the rate was but a quarter of what it was sixty years ago, 1·03 in place of 4·4 per 1000 deliveries. His figures regarding the amount of interference in the two periods are of great value, though, unfortunately, those of the recent period are confined to the cases in one year only (1928) and may thus differ considerably from the average. The percentage of Cæsarean sections suggests an error that would be lessened somewhat if a greater number of years had been averaged. It works out at 1·3, the

same as the total interference in the early series. Over one abdominal delivery in an average sample of 100 obstetric cases would certainly be excessive. By careful antenatal supervision the percentage of obstetric interference in all cases in 1928 was under seven, and the forceps rate under five. Small though it was it was five-fold what obtained in the earlier period, and Mr. GIBBERD considers that this greater interference eliminated the cases of profound exhaustion in the earlier series, and with an improved technique lessened the incidence of sepsis. His comparison of the results attained in various obstetric complications is particularly instructive as showing where treatment to-day has advanced and where it has stood still. The facilities for the removal and reception of serious cases indoors must have been improved in the sixty years and also be a factor in producing better results. His paper is a valuable contribution to the maternal mortality discussion and forms a happy augury for its reduction once some such national scheme as that of the British Medical Association is put into operation. We trust that the Association will now set to work on the task of translating its scheme into legislation.

MEDICAL EDUCATION IN U.S.A.

HIGH ideals, boundless energy, and vast wealth have, in the last 20 years, completely revolutionised medical education in the United States. ABRAHAM FLEXNER'S report of 1910 crystallised the situation and was quickly followed by the extrusion of most of the incompetent and fraudulent institutions—about one-half of the whole number—and by an extraordinary increase in the equipment and efficiency of those which were left. Many of the best medical schools in the world are now in the United States. So deliberately have these changes been planned and so quickly have they been brought about that they are easily within the academic life of an individual; they can be seen from the beginning and hence form at the moment the chief object of interest for those engaged with the medical curriculum and with the methods and results of teaching. Statistical tables and graphs in the annual educational number of the *Journal of American Medical Association*, which has just reached us, illustrate the progress which is being made. It continues to be true that the number of persons who apply for admission to the medical schools is considerably in excess of the accommodation. Each good school admits a definite number of new students each year. Taking all the schools together about 60 per cent. of the applicants are accepted. In England we can, at present, only envy any school which starts with students so highly selected. The selection is continued in the subsequent years; unsatisfactory performance and laziness are rebuked once and then expelled, the loafer and the chronic are unknown. Substantial progress has also been made at the other end of the curriculum. A university degree in medicine carries with it no right to practise. For this, qualification by one of the State licensing boards is necessary. Since the Federal Government has no control over education, and since it cannot infringe any of the privileges of the State legislatures, there is no official method by which the procedures and standards of the various States can be correlated and brought into reasonable agreement with one another. But an unofficial body—"the National Board of Medical Examiners of the United States"—emanating in 1915 from Dr. W. L. RODMAN and the American Medical Association, has gone far to supply the deficiency. It holds examinations in many of the chief medical schools and grants a diploma which has so quickly established its reputation that already it is accepted by the licensing authorities of 37 States in lieu of their own examinations. It will no doubt secure the desirable end that practitioners qualified anywhere in the States can practise anywhere in the States, and not as at present only in their home State, and that the standard for qualification will be everywhere the same.

A further achievement worthy of notice is the physical realisation of an intimate coöperation between the university, the laboratory sciences, and the wards which many reformers have desired. The Rockefeller Institute has published an illustrated account of the new Vanderbilt University School of Medicine, at Nashville, Tennessee, which has been erected at a cost of something more than 1½ million pounds. In the first place, the whole school and hospital are topographically and actually part and parcel of the university; in the second place, the science departments, from anatomy and biochemistry onwards, are in the same building as the wards. The school of nursing is next door. The clinical staff includes part-time as well as whole-time teachers. It has been urged in some quarters for years past that, if the teaching of medicine is to reach a university standard, the university ought to control the wards as it does the dissecting rooms. The difficulty in doing this has been mainly financial, and the various arrangements whereby students have the run of hospitals not under university control have generally worked well enough. Recent events in Cardiff, however, have given a signal example of the dangers of the common method, and no doubt the Vanderbilt plan is preferable if someone will find the money; the cost at Nashville is about £75,000 a year for 208 beds. The housing of all departments under the same roof is certainly no less important if coöperation rather than individuality is aimed at. A common luncheon room can do a great deal to bring the laboratories and the wards together, and in the Vanderbilt school the science departments occupy the lower floors of the same blocks as carry the wards above. Theoretically, therefore, the new school seems to be a distinct advance. There is, however, at present, at any rate, one substantial criticism to make. The school admits 50 students each year and 208 beds seem quite an inadequate allowance for practical clinical teaching; there must surely be an undue proportion of theory to practice. In pathology, too, practical experience must be sadly defective. Large and important parts of pathological anatomy can be learned only in one way—on the fresh dead body. And as only about half the deaths come to autopsy, it is difficult to see how the students learn the subject which is the basis of so much of their clinical work. We should be glad to hear that the Vanderbilt school had seen the necessity and found the money to double their beds.

CREMATION AND PUBLIC SAFETY.

IT was inevitable that the series of inquests and exhumations in connexion with the late Mr. DUFF and his family should create a certain misgiving or disquietude which would find public expression. In a letter recently published in the *Times* Mr. ERNEST H. COOK, D.Sc., offers some not unreasonable comments and suggestions. He remarks in the first place that the system of disposing of the dead by

cremation is one which is commending itself to an increasing number of thoughtful people on the score of communal hygiene and public health; yet, if the victims in the recent cases where foul play is suspected had been cremated, the supposed crimes would have gone entirely undetected. The files of the Director of Public Prosecutions probably contain similar instances, and it is doubtful whether the Home Office will feel disposed to view with equanimity the possibility that poisoners and others can at present escape the consequences of their misdeeds. The existing safeguards under the Cremation Rules have been regarded as adequate; there must be a sworn application from an executor or near relation who must declare that he knows no cause why cremation should not take place. There must also be two medical certificates, one from the practitioner who attended the deceased and another from a medical referee. The question is whether there should not be also a thorough post-mortem examination and chemical analysis, though, even if these additional precautions are added, mistakes may occur. Dr. COOK considers that in Mr. DUFF'S case, if cremation had been applied for, it would almost certainly have been granted. This, however, is by no means sure; there were puzzling symptoms about Mr. DUFF'S death to which his medical attendant drew attention and which removed the case from the absolutely normal; it should be possible so to frame and carry out the regulations that cremation can never be sanctioned in any case of doubt.

A second point is made by Dr. COOK with regard to judicial autopsies. No analyst, he says, can safely claim never to have made a mistake. Moreover, the analyst's task is deliberately made harder by the absence of information which might be useful to him. The coroner's officer delivers to him one or more jars containing portions of organs with the request that these shall be tested "for poisons." Our strong national desire not to prejudice a possible defendant has resulted in the practice of giving the analyst no indication of the symptoms and no aid either in ruling out one particular poison or in concentrating upon the search for traces of another. The analyst who, if fitted at all to assist in the administration of justice, would hardly allow himself to be unduly influenced by such information, is thus unfairly handicapped. Dr. COOK suggests that recourse might be had to the plan adopted in proceedings under the Food and Drugs (Adulteration) Act. In those proceedings an inspector divides the purchased article into three parts; one of these is sent to the public analyst, a second to the tradesman, and a third is retained for analysis in case of dispute. Dr. COOK holds that it is anomalous to require less careful corroboration on charges of murder than when a man is prosecuted merely for adding boric acid to milk. With his suggestions for reinforcing and confirming the evidence in murder cases and for eliminating the chance of mistake there will be general agreement. They make, however, too little allowance perhaps for the natural feelings of relatives to whom the body of the deceased is something sacred. Public opinion may tolerate interference with a dead body in the effort to detect and punish the foul crime of the poisoner; it may be reluctant to contemplate such interference as a mere preliminary to cremation in a normal case. We have given up—though not so very long ago—the barbarity of drawing and quartering the bodies of our criminals: the average citizen is probably unprepared for what (however mistakenly) he might regard as similar treatment of the bodies of the innocent.

Annotations.

"Ne quid nimis."

MASS SUGGESTION AS A CLINICAL METHOD.

ALTHOUGH the subject is of fundamental importance we are still far from generally accepted conceptions of the influence of mental processes upon bodily functions. In the *Münchener Medizinische Wochenschrift* of August 9th Dr. Alfred Brauchle, advocating the use of suggestion therapy by the general practitioner, offers a theory of vitalism involving the conception of an organic unconscious. This is a mind-like principle existing in hydra, the germ-cell, or man, whose action is to unify the separate bodily functions, and it is the organic unconscious that we stimulate by non-specific therapy such as the injection of foreign protein or the use of sun baths. It can be stimulated, on the other hand, by way of the mental subconscious, and Dr. Brauchle quotes several workers who have shown the influence of hypnotic suggestion in neutralising the effect of drugs upon the functions of the vegetative system. His therapy consists in elaborating to a group of patients the theory here briefly outlined and then, with the patients in a state of relaxation, using the formulæ made popular by the late Mr. Coué. He gives a table covering the results of three years' work in the Hydropathic Institute of Berlin University, and believes that his results justify the claim that the Coué method is the most useful form of psychotherapy for the general practitioner, who can by this means treat many of his patients psychotherapeutically at a cost of two or three hours a week. As a practical way of dealing with the nervous troubles that bulk so largely in ordinary practice this method has the advantage of simplicity, but its theoretical basis is questionable. Dr. Brauchle's vitalistic theory prepares the patient for the reception of the healing suggestion; its intrinsic validity seems immaterial, and any theory acceptable to the audience would probably act equally well. Essential to all such methods is the induction of belief, and, though Dr. Brauchle's enthusiastic belief in his own theory is plain, yet there are many of us who could not feel its truth even if our lives depended upon the feeling. A weightier objection to simple methods of this nature is the risk of being content with the explanation involved in them. Dr. Brauchle notes, indeed, that the mental subconscious preserves forgotten and suppressed memories, experiences, and dreams, and produces disturbers of the peace that can operate as lasting causes of illness; but he makes no further use of what modern psychopathology has taught about the intricate causes of minor mental disturbances, and leaves his readers to believe that in suggestion we have an efficient and sufficient means of handling these troubles. Suggestive treatment, based upon the most varied theories, has had its successes as far back as the history of medicine goes; it may still have a part to play but no longer occupies the whole of the psychopathological stage.

PERNICIOUS ANÆMIA.

Dr. C. Price-Jones [1] has returned to the study of the red cell diameters in anæmia and the construction of the curves which bear his name, by going back to the beginning and performing the laborious and very useful service of determining the range of normal variation by measuring 500 red cells in each of 100 healthy persons. The general average is 7·20 μ, and anything between 6·69 μ and 7·72 μ seems to be compatible with health. A few cases of frank pernicious anæmia come within these limits—5 out of 50 in the series he quotes—and he points out that a high variability of the diameters is an even more constant

[1] Jour. of Path. and Bact., 1929, xxxii., 479.

character of pernicious anæmia than an excessive mean diameter, though of course hæmorrhagic anæmias, in which the diameters are too small, also have a variability greater than normal. Diagnostically a high coefficient of variation with a diameter of 7·5 μ or more would put a case in the pernicious anæmia class. The effect of treatment must be gauged in the light of the range of healthy variation. He gives the data for 12 cases treated with liver extract until the anæmia was cured and the symptoms had disappeared. In nine cases the mean diameter came back within the normal range, but with one exception none became as small as the normal mean. One patient whom liver treatment restored to an active working life despite well-marked cord degeneration, still had a mean diameter as high as 7·9 μ. Similarly, some but not all of the coefficients of variation became normal. Taking one criterion with another the red cells actually became "normal" in only six of the 12 patients. This is perhaps what might be expected if liver cures symptoms without removing the cause of the disease.

MEASLES IN LONDON.

A REPORT by the school medical officer, Dr. F. N. Kay Menzies, recently issued by the Education Committee of the London County Council, gives interesting details of the behaviour of measles. Lately epidemics have occurred regularly in London at intervals of 18 months, and have lasted about six months. The disease is notifiable in two metropolitan boroughs (Paddington and Fulham), and as regards the first case in a household in seven others (Greenwich, Hampstead, Lambeth, St. Pancras, Southwark, Battersea, and Finsbury). But even if it were notifiable generally, many cases would escape notification owing to parents wrongly regarding measles as a trivial complaint.

The cases coming to the knowledge of the school authorities during the last three epidemics were: (1923–24) 41,261, (1925–26) 39,387, and (1927–28) 41,477. As measles is especially a disease of pre-school (2–5 years) age, it is estimated there were about 100,000 cases during each epidemic. The districts in which the school population were least affected were Poplar, Stepney, Bethnal Green, Southwark, Chelsea, and Westminster, owing to the fact that in the congested and poorer areas the children suffer from measles before they reach school age. The deaths during the last epidemic numbered 1357, as compared with 1034 in the previous epidemic of 1925–26. The report shows that methods of prevention, such as school closure and exclusion of susceptibles on the receipt of reports of the first cases, have failed, and that immunisation is not as yet practicable. Since 1921 a scheme has been in force, the aim of which is, by coöperation between the school and the borough authorities, to get hold of the cases early and by timely succour to prevent or secure early treatment for the complications which are the chief cause of death and permanent injury. Under this scheme efforts are made to educate the parents that measles is not a trivial disease, and to provide home nursing and removal to hospital from unsuitable homes at the earliest possible moment, and especially to concentrate efforts on overcrowded and insanitary areas, where the effects of measles are notoriously disastrous. The success of the scheme appears to depend on the closeness of coöperation between the school and the borough agencies, and it is mentioned, for example, that in Wandsworth promptitude has been secured by direct consultation between the school nurses and the borough health visitors, with an apparent effect in diminishing the mortality. Sixteen of the 28 borough medical officers of health consider the scheme valuable, and in Deptford the earlier information obtained as to cases has enabled compulsory notification to be discontinued.

The provision of hospital treatment has proved difficult. Under existing arrangements at the height of each epidemic there comes a time when selection of cases for admission must be exercised. The state of the home, and the age of the cases (measles being notoriously fatal under 2 years) are among the guiding factors. Admission to hospital after broncho-pneumonia has begun must be prompt to be of any use at all. The M.A.B. records show that during the last epidemic 8729 patients were admitted, and that of these 626, or 7 per cent., died. Of the patients admitted suffering from complications, 31·7 per cent. died, whereas of those who were free from complications on admission only 1·9 per cent. died. Broncho-pneumonia was the cause of 542 of the 626 deaths. Of the 8729 admissions, 1042 had broncho-pneumonia when admitted, and 107 more developed it within the first day. The next epidemic is due towards the end of 1929, and some of the lessons from past experience are: that more use should be made of the local knowledge of the health visitors and school nurses in order that waste of time by unnecessary visitation may be avoided, and that the needed succour may reach its objective promptly. It is also urged that the school nurses be relieved of clerical duties, such as tabulation of lists, so that they may have more time for actual visiting, and that an endeavour be made to secure even closer coöperation between school nurses and health visitors.

THE BLOOD LIPOIDS IN PSYCHOTIC PATIENTS.

A CAREFUL piece of biochemical research in which the results obtained from psychotic patients are criticised and analysed by statistical methods has recently been published by Sven Stenberg from the Psychiatric Clinic, Konradsberg Hospital, Stockholm.[1] The range of variation both in normal controls and in psychotic patients has been estimated and allowed for, and since the exact limits of the experimental error of the method used have been ascertained, the conclusions reached by the author carry conviction. In a preliminary review of the literature, Dr. Stenberg shows how little of the published work on the subject fulfils the necessary conditions, and that the variations in results are thus explained. He points out that while different methods of estimation will give discrepant results, yet each, if used alike on controls and patients, and if studied by proper statistical methods, provides material from which valid conclusions may be drawn. The method adopted by him was the micromethod of Bang as modified by G. Blix, determining the total quantity of cholesterin separately and also together with the total fatty acids. While the method has been thought unreliable by some workers, he finds that the errors are eliminated by careful technique after practice, and calculates the standard error to be negligible in comparison with the variations found in different individuals and in the same individual under different conditions. In the normal controls he finds a striking individual constancy, but a considerable range of variation between individuals, the total fatty acids, but not the cholesterin, being higher in women than in men. In the manic-depressive group of cases the total cholesterin is greater than in normal persons and also greater than during remissions. In the dementia præcox group the early cases are differentiated from those of over a year's duration: in the former the total cholesterin was found higher than in normal and remittent cases. In the latter the group taken as a whole shows no significant difference from the normal group. This result is due to the cancelling out of two subgroups; the emotionally dulled cases gave values lower than the normal, while the emotionally heightened ones were higher than the normal, an intermediate group giving approximately normal ranges of values. The general conclusion reached was that a change in cholesterin content of the blood is to be correlated with emotional disturbance, though the exact nature of this correlation has yet to be discovered. The total fatty

[1] Psychosis and Blood Lipoids. Quantitative Variations of Total Cholesterin and Total Fatty Acids in the Blood in Manic Depressive Psychosis and Dementia Præcox. Stockholm: P. A. Norstedt. 1929. Reprinted from Acta Medica Scandinavica.

acids give less definite results, but generally follow the same course as the cholesterin. The author suggests that the effect of insulin both on blood lipoids and on the emotional state is a line of investigation that might prove fruitful.

ARTIFICIAL LIGHT IN TUBERCULOSIS.

ARRANGEMENTS were made by the London County Council in 1926 to put into operation an experimental scheme which would enable the metropolitan borough councils to utilise the approved facilities for artificial light treatment provided at certain hospitals and centres in London. We learn from the Council's recent annual report that this experimental scheme was tried in 1927 and continued throughout the year 1928. It appears, however, from reports received from the tuberculosis officers of the 19 boroughs that little use has been made of the scheme, an average of only six cases during a period of about nine months having been recommended from each of the boroughs taking part in the scheme. The reports of these officers are said to have disclosed practically no evidence of benefit having been derived by the patients from this form of treatment. The experience of 1928 confirms the view that good results are obtained only when light treatment is given as an additional method of treatment under suitable conditions in residential institutions in the country. The London County Council has therefore decided to proceed no further with the scheme, but rather to bring to the notice of the borough councils the importance of ensuring that all cases of active tuberculosis, whether pulmonary or non-pulmonary, particularly in the early and remediable stages, should be recommended for residential treatment at the earliest possible moment.

A STATISTICAL STUDY OF HEART DISEASE IN CHILDREN.

STATISTICAL methods have not hitherto found much favour in the study of heart disease on account of the difficulty of obtaining sufficient accurate data for statistical analysis. The Heart Committee of the New York Tuberculosis and Health Association is endeavouring to overcome this difficulty by adopting a uniform nomenclature and standardising so far as possible the descriptive terms used in case-taking. The committee hopes thereby to render the observations in different clinics more strictly comparable one with another, both history and physical examination being recorded in a uniform fashion on forms which have been carefully thought out for the purpose. Their work is now beginning to bear fruit, and the third of a series of statistical studies dealing in this instance with heart disease in children has recently been published.[1] It is based on an analysis of the case-histories of 500 children observed in a clinic under the same medical supervision during a period of ten years, 38 per cent. of the cases having been kept continuously under observation for more than three years.

In this series 50 per cent. of the children were between the ages of 6 and 10 at the time they were first seen, and 62 per cent. were over 11 years of age at the end of the period under review. Seventy-nine per cent. of the whole series gave a rheumatic history and of these three-quarters developed organic heart disease, the remainder being provisionally classified as "potential cardiacs." In the affected cases the heart lesion generally became manifest within 12 months of the onset of the rheumatic infection, and in point of fact was probably synchronous with it. In 50 per cent. of the rheumatic cases in this series the first infection occurred between the ages of 6 and 9, the average age of onset being 7·3 years. It appears that about the age of 12 a certain degree of immunity begins to develop, older children being less liable to infection, and the writers point out the importance of bearing this fact in mind when attempting to evaluate the results of therapeutic measures. Relapses occurred in 73 per cent. of the cases studied, and were most common within three years of infection. This figure, however, is probably an underestimate of the true incidence of relapses, for many of the cases in which no relapse was noted were under observation for only a short period of time. In the age-groups between 3 and 9, comprising 234 cases, the first relapse took place within one year of the onset in about 50 per cent. of cases, while in the smaller group where the first attack occurred after the ninth year, the percentage of cases in which the first relapse occurred within 12 months was 72 per cent. The writers suggest that the onset of puberty may possibly be a factor in predisposing to early relapse in these cases. Twelve per cent. of the children died, the most common age of death being between the eleventh and fourteenth years; 88 per cent. of the deaths were attributed to rheumatic heart disease. The writers are strongly of opinion that "growing pains" are of no less significance than chorea or polyarthritis as a manifestation of rheumatic infection, but they do not consider that any of the extracardiac manifestations of rheumatism can be regarded as giving an indication of the degree of heart involvement. Rheumatic nodules occurred in 60 patients, appearing most frequently at the end of periods of acute infection; 20 of these children died. With regard to valvular lesions, it is interesting to note that of 157 children, who appeared to have only mitral regurgitation on admission, 48 eventually developed stenosis; in 34 of these the stenosis took three years or more to develop.

The crippled hearts which result from rheumatic infection in childhood constitute one of the most tragic pictures in the wards of our great hospitals. Their future seems so hopeless, and it is encouraging to learn from the American analysis that so far as the functional results are concerned the outlook is on the whole quite good, for in 70 per cent. of the present series there was little or no impairment of the exercise tolerance. This justifies the belief that although we are still far from being able to prevent rheumatic infection, we can at least hope to limit its most serious sequelæ. The object of the New York Committee is to collect a sufficiently large mass of information concerning heart disease in order to be able to treat it statistically. There are bound to be differences of opinion as to the value of the results so obtained; but provided the data are reliable and sufficient care is taken to limit the inquiry to simple issues, from which complicating factors can be definitely excluded, information of real value will be obtained. While it may not be right to speak of definite "laws" in biology in the sense in which the word is used in physics or chemistry, we may at any rate hope by work of this kind to ascertain the general tendency of rheumatic disease and the extent of variation in individual cases.

[1] Amer. Heart Jour., 1928, iv., 164.

FAT AS AN ESSENTIAL ARTICLE OF DIET.

SINCE the discovery of the fat-soluble vitamins there has been a tendency to regard fat as being an unimportant dietary constituent, capable of substitution by carbohydrate, when once those vitamins of which fats are the ordinary vehicle have been adequately supplied from some other source. J. C. Drummond [1] in 1921 reared and bred young rats on a fat-free diet, supplying the fat-soluble vitamins as the unsaponifiable fraction of cod-liver oil. The subject has been attacked again recently by G. O. Burr in conjunction with H. M. Evans [2] (1928) and with M. M. Burr [3] (1929); in their experiments the growth of rats was checked and lesions developed when fat was completely excluded from the diet. Growth was promoted and the lesions were

[1] Drummond, J. C., and Coward K. H.: THE LANCET, 1921, ii., 698.
[2] Evans, H. M., and Burr, G. O.: Proc. Soc. Exp. Biol. and Med., 1928, xxv., 390.
[3] Burr, G. O., and Burr, M. M.: Jour. Biol. Chem., 1929, lxxxii., 345.

prevented or cured by the addition daily of 10 drops of lard or other fat, or of the fatty acids from lard, but not by the addition of glycerol or of the unsaponifiable fraction from lard. The Burrs go so far as to describe the condition produced as "a new deficiency disease produced by the rigid exclusion of fat from the diet." The symptoms described, of which an annulated and necrotic condition of the tail is particularly characteristic, are not unlike those which occur in pellagra of the rat, caused by an insufficiency of vitamin B 2, but the Burrs are emphatic that increase of the supply of the B-vitamins by means of ether-extracted yeast had no effect upon the syndrome. They do not, however, make it clear that ether extraction might cause yeast to be deficient in vitamin B 2. H. M. Evans and S. Lepkowsky[4] (1929) have come to the conclusion that the inclusion of large amounts of fat in the diet of rats has a very important effect upon the body's requirements of vitamin B 1. They describe the phenomenon as "the sparing action of fat on the antineuritic vitamin B" and show that even when there is no vitamin B 1 in the diet, vitamin B 2 being provided in the form of autoclaved yeast, the rat can survive if the diet contains as much as 50 per cent. of fat; if small but still insufficient amounts of vitamin B 1 are given to the rat, the amount of fat which will produce normal growth is less than 50 per cent. The "sparing" action is considered by Evans and Lepkowsky to apply only to vitamin B 1, for when the latter was given, as an alcoholic extract of rice bran, and vitamin B 2 was withheld, the weight curves of the rats are interpreted as showing that the addition of fat had little beneficial effect. In our view the weight curves do not quite bear out the interpretation that the saving action of fat applies only to vitamin B 1, for there is a very marked improvement in them when fat is added to the diet deficient in vitamin B 2. There is thus in both these sets of observations certain common ground for suspecting that the B-vitamins are involved in explaining the part played by the fat. Inclusion of fat in the diet might operate on the organism in many other ways than straightforwardly as a correction of a simple deficiency of fatty acids. The biological study of the B-vitamins is set about with the most thorny difficulties, such as are introduced by the habit of coprophagy and the phenomenon of refection, and it is perhaps rather hasty to interpret these observations on rats as evidence of a new deficiency disease.

PAROXYSMAL SNEEZING.

THE average text-book of medicine has little to say about sneezing, beyond the vague statement that a sneeze is an involuntary reflex respiratory act. Yet the sneeze is a symptom of many disorders from hay-fever to the common cold; it may be the first sign of measles or only the result of stimulation of the optic nerve by a bright light. The Greeks and Romans considered the sneeze as a definite omen from the gods and it was one of the common everyday phenomena, which if it occurred at a moment of special import could be interpreted as presaging the future. There are many allusions to sneezing in classical literature, but it is a line from a popular refrain well known to a former generation "He sneezed so hard with the whooping-cough" which is most relevant to the case recently described by Dr. Alan Moncrieff and Dr. R. C. Lightwood.[5] A little girl began an attack of whooping-cough in the ordinary way at the end of January, 1929. At the beginning of March she ceased to whoop and began to sneeze instead. Her sneezing attacks occurred about ten times a day and each attack caused great distress and incontinence of urine. She had suffered from these attacks for three weeks when she developed the broncho-pneumonia which led to her admission into hospital. There the paroxysms of sneezing continued, although she did not cough or whoop. The paroxysm consisted of a rapid series of "expiratory sneezes" resulting in the expulsion through the nose of large quantities of tenacious muco-pus. At the end of the paroxysm the patient drew in her breath and lay back cyanosed and exhausted. As the broncho-pneumonia got better a slight whoop developed and for a time she had both whooping and sneezing attacks. At the end of six weeks from the onset of the pneumonia the whoop had disappeared, although occasional mild sneezing attacks continued. Bacteriological examination of the muco-pus discharged from the nose in one of the paroxysms demonstrated the presence of Gram-negative bacilli of the pertussis type. This variation in the normal course of whooping-cough was apparently well known to the physicians of many years ago, for there is an allusion to it in an interesting treatise on the disease by Dr. Thomas Watt, of Glasgow, published in 1813. Several continental authors refer to the condition which has also been described by J. P. C. Griffiths and A. G. Mitchell, and by J. D. Rolleston. Szegö, of Budapest, suggested in 1900 that such sneezing attacks made it probable that the spasmodic features of pertussis had a central origin. More recent writers have mentioned other equivalents of the whoop in pertussis and the list includes paroxysmal hiccough and paroxysmal yawning. Dr. Moncrieff and Dr. Lightwood give a short review of the literature of the subject and note that adults with apparently intractable coryza may really be suffering from whooping-cough and may infect children. Apart from their rare appearance in whooping-cough, true paroxysms of sneezing are mainly associated with anaphylactic disorders such as hay-fever; when they develop suddenly in children not sensitive to pollen, the possibility of whooping-cough should be considered.

[4] Evans, H. M., and Lepkowsky, S.: Jour. Biol. Chem., 1929, lxxxiii., 269.

[5] Paroxysmal Sneezing in Whooping-cough, Arch. Dis. Child., August, 1929, p. 240.

STERILISATION OF THE UNFIT.

WHILE those most intimately concerned with the care of the mentally defective in this country continue steadily to oppose sterilisation as an auxiliary measure to the more important segregation, a number of interested people continue to press its claims. They are encouraged by the results of American experiments, which have caused the majority of social workers and medical men concerned with the problem of amentia in the United States to advocate a carefully safeguarded authority for sterilising suitable cases. Dr. K. B. Aikman returns to the subject in the *Edinburgh Review* for July. He begins by attacking the doctrine of the equality of man, and goes on to deplore the racial suicide of the middle classes. He does not believe that the peculiar qualities of these classes can be perpetuated for the nation by constant recruitment from lower strata. He attributes the "suicide" to a complex of many factors: increasing density of population with increasing competition, calling for longer training for learned professions and technical occupations, and hence later marriages and a greater cost of launching children into the world, while the earning power of the manual labourer is at its highest when his physical growth is complete. A higher standard of living, a reduced value of money, and an increasingly materialistic outlook have led to the reduction of families, which has been facilitated by modern methods of birth control. Coincidently with this decrease in the middle-class population there has been an actual increase in that of the poorer classes, for every new triumph of hygiene has produced its first results among the poor. The decrease in the infant mortality-rate is a reflection of the number of lives saved to the working-class population, and Dr. Aikman would temper our self-congratulation on this achievement because it is based on statistics which pay no heed to quality. He finds cause for anxiety in all directions: the recruiting figures of 1917–18, the lack of fit emigrants, the ill-health of

school-children, and the amount of time lost through sickness among the insured population. He finds the increase in the number of insane and mentally defective persons most disquieting. The difficulties in the way of remedy appear to him to be purely ethical; we are not able to increase the death-rate by failing to encourage the survival of the less fit, and all we can do is to fail to encourage the arrival of the less fit. He claims that measures designed primarily to increase the number of better citizens should be directed broadly to the assistance of those sections of the community which contain the greatest proportion of desirable characteristics. Since persons handicapped by disease and antisocial qualities will always tend to gravitate to the worst paid employments and most slovenly surroundings, the poorest classes must always contain a large proportion of the least desirable citizens. In view of this fact, and of the fact that the main bulk of the people lie close to the average of any given quality, and that it is impracticable for everybody to have as many children as is physically possible, a slight increase in fertility of the fairly large numbers who are just above the mean and a slight decrease in the equally large population which is just below the mean will do more for the race than trebling a few highly superior families. The legislation at which Dr. Aikman would aim must accord with the dictates of humanity, must increase the fertility of the middle classes, and must avoid the selection of individual beneficiaries by bureaucrats. Numerous economic measures have been tried or suggested; all of them are capable both of good and of harm and all have proved disappointing in practice. Economic measures alone cannot solve the problem. The solution must depend on the recognition of responsibility. In this country we have no law requiring that persons discharged from mental institutions should even be warned that their weakness may be transmissible, and indeed it is common enough for defective girls to be discharged by magistrates on condition that they marry. The only way out of our parlous situation seems to Dr. Aikman to be the sterilisation of persons who are well enough to be discharged from mental institutions but who are certain or highly likely to produce defective offspring. He grants that segregation is an ideal measure, but regards it as wholly impracticable if only on the ground of expense. He considers that legislation to check procreation by the unfit should have an educational influence on the general public out of all proportion to the number of individuals actually affected. In answer to the criticism that this interferes with the liberty of the subject, he points out that this question must be considered from the point of view of the greatest happiness of the greatest number, and, in Dean Inge's words, "by far the greatest number are not yet in existence."

BENEFACTORS OF MANKIND.

THE *Manchester Guardian* has recently held a competition to choose six persons who might lay claim to the distinction of being called the greatest benefactors of mankind, Lister being the type suggested, and therefore excluded from the list. The six representing the votes polled were:—

1. Pasteur.	4. Rontgen.
2. J. Y. Simpson.	5. Jenner.
3. Mme. Curie.	6. Ross.

The readers of the *Manchester Guardian* are well known to be the most intelligent group of citizens in this country, and it is gratifying to find that they set such a high value on the relief of pain and suffering. It is also interesting to note that they put this particular interpretation on "benefactor," though this may be due to the suggestion made in the setting of the competition that Lister was a good example. On this view a "benefactor" is one who makes life more tolerable. The concise Oxford Dictionary says "person who has given one friendly aid," which is compatible with the view that the best benefactors of mankind are those who have enlarged human life, more especially in the intellectual and spiritual spheres. Of the chosen six, Curie alone would satisfy this criterion, and she comes third, probably because radium is good for cancer, and not because its discovery is one of the great events in our understanding of the natural world. Darwin would come here too, though he was suggested by only a few of those who sent in lists. The problem set is, of course, insoluble, as most interesting problems are. But whatever the answer which is most nearly right, it is encouraging to see medicine so highly thought of.

INTERNATIONAL SOCIETY OF MEDICAL HYDROLOGY.

THE sixth annual meeting of the Society will take place at Budapest from Oct. 13th–18th, under the patronage of the Archduke Dr. François Joseph and members of the Government. Medical discussions on the 14th and 15th will deal with the Action of Hypertonic Waters and the Use of Baths and Waters in Cardiovascular Affections. A meeting of the Ligue Internationale contre le Rhumatisme will be held on the 16th to consider the Relation between Acute and Chronic Rhumatism in the Various Countries and the Hæmatology and Serology of Rheumatism. The Society will be entertained by the Prime Minister, the City of Budapest, and by the Balneological Society of Hungary. Excursions will be made to the "Bitter Water" springs, the bathing establishments, Lake Balaton, and other places of interest. At the conclusion of the meeting the party are invited to visit Vienna to view the hospitals and clinics and the establishments at Baden. Special reductions in cost are offered to the Society and their friends. The English party will leave London on Friday, Oct. 11th, and a few vacancies are available for medical men or women who are interested in hydrology. Particulars on application to the Hon. Secretary of the Society, 139, Marylebone-road, London, N.W.1.

FACIAL ERYSIPELAS.

IN a contribution to the *Jour. Amer. Med. Assoc.* of August 10th Dr. David Seegal and Dr. Beatrice Seegal have analysed a series of 281 cases of facial erysipelas admitted to the wards of the Massachusetts General Hospital between the years 1870 and 1927 into nine somewhat arbitrary categories. Their results are illustrated by graphs of value to the statistician or to an epidemiologist, if of little interest to the practitioner. In their summary of conclusions the following points are worthy of note. The months of greatest frequency were from May to December, when, though this may be a coincidence, sore-throats due to the *Streptococcus hæmolyticus* are most frequent. Thirty-eight of the cases (13·5 per cent.) occurred in the hospital personnel; of these, 22 were nurses, 12 were members of the domestic staff, 3 were laundry workers, and 1 was a physician. The inference seems to be that these cases were the result of actual contact, direct or indirect. Forty-eight per cent. of the 281 cases occurred in patients after admission to hospital; about half this number were medical patients, the rest surgical, in whom slightly more than half had recently undergone some facial operation. The temperature was usually high during the first two days of the disease, and in about three-quarters of the total number of cases reached 104°–105° F. at some period of the evolution of the attack. The untreated case left to its natural course sometimes terminates abruptly by crisis in from 4–7 days. The mortality in the series was 19·6 per cent. This figure includes patients who were suffering from some other serious disease at the same time. When these are excluded the percentage of deaths works out at only 5. As is generally known, the prognosis is most serious at the two extremes of life.

This analysis, extending over 60 years, is interesting, but it is doubtful if the conclusions reached are of much

practical importance at the present time. All modern observers will agree that true fulminating and terminal cases, such as were doubtless common before the days of antisepsis, are exceedingly rare in our day. Whether this is due to the diminished virulence of streptococci, to which the mildness of present-day scarlet fever is attributed by some epidemiologists, is of theoretical interest. It is significant, however, that the dermatologist sees a considerable number of mild cases of a relapsing type, and it would be worth while to ascertain if these, when added to the number of cases falling into the true acute group, would bring the total number of cases of erysipelas occurring in the periods 1875–1885 and 1919–1929, in a given hospital, to approximately the same total figure. Protein shock treatment has given a very much better outlook to all cases of erysipelas. Experience seems to indicate that a specific serum is not more potent than any foreign protein capable of producing the chain of phenomena we term shock, and that it is therefore unnecessary to jeopardise convalescence by injecting horse serum when milk protein will have the same therapeutic effect. In cases of the subacute relapsing type on the face, if the focus of the infection is not discovered and treated, continual recurrences with ultimate local complications, such as lymphangitis and a form of intractable elephantiasis, are to be feared. Unfortunately, the utmost diligence and patience sometimes fail to reveal a focus, and it is in these cases that the prognosis as regards complete restoration is unsatisfactory.

SEXUAL REFORM CONGRESS.

THE Third International Congress of the World League for Sexual Reform, which is being held at the Wigmore Hall, London, during the present week, opened on Sunday evening in the presence of about 120 members with an address of welcome from one of the Presidents, Dr. Magnus Hirschfeld, of Berlin, the hon. treasurer, Mrs. Dora Russell, and the hon. secretary, Dr. Norman Haire. Dr. Hirschfeld recalled the last occasion when he spoke in London, at the International Medical Congress of 1913, when the meeting was interrupted by suffragettes. Much of the progress for sexual reform since made he attributed to the political emancipation of women which had taken place in this and other countries. It was, he said, only during the present century that sexual science was winning for itself an independent position among the natural sciences. Sexual biology was still in its infancy, and much of what had been written on the subject had been dictated by points of view other than purely scientific. Sex abnormality was, he said, a fact which must be reckoned with, and should neither be over- nor under-estimated. One point he wished himself to emphasise at the outset of the Congress was that men and women whose sexual temperament diverged from the normal should neither marry nor have children. Mrs. Russell also recognised the fruitful effect of woman's political emancipation on her economic and sexual equality. Scientific investigation of sex problems would not in itself affect conduct, but was a necessary preliminary to other measures. While she hoped that a congress in London would bring publicity to the movement, she felt that its most substantial advantage would result from the free discussion between men and women of subjects which concerned them both equally. Dr. Haire set out briefly the objects of the League, the first of which is a political, economic, and sexual equality of men and women, which included the liberation of marriage and especially divorce from the present tyranny of Church and State, the control of conception so that procreation may be undertaken only with a due sense of responsibility, and a rational attitude towards sexually abnormal persons. Many of the aims are common to other spheres of social activity, but it is a thesis of the League that only those sexual acts should be considered criminal which infringe the sexual rights of another person. In the programme of the Congress, which is a very full one, a whole day is allotted to the vexed question of sex and censorship, to which a number of distinguished literary men are contributing.

THE EFFICIENCY OF CARDIAC MASSAGE.

THE observations of the coroner in a recent case in which heart massage restored the circulation after failure during anæsthesia raise the important question of the time at which this extreme measure should be employed. The fact that effective cardiac massage cannot be applied to the adult without opening the abdomen makes it obviously desirable to employ this form of resuscitation only as a last resort unless the abdomen has already been opened during the operation. At the same time if it is to be used with any benefit certain time limits must not be overstepped. It is generally held that artificial respiration should have been efficiently employed for fully five minutes before cardiac massage is attempted. There are now quite a large number of cases on record in which restoration of the circulation was attributed either to cardiac massage or to intracardiac injection of adrenalin. It is not certain in all these recorded cases that properly carried out artificial respiration would not have been successful, even without direct stimulation of the heart muscle. The ultimate prognosis in these patients depends on the power of recovery of the brain cells, which are those most readily damaged by stoppage of the circulation. It is generally held that the cortical cells cannot be revived after about 15 minutes of circulatory deprivation. Dr. T. Lumsden notes (see p. 585) that in his experiments on cats the cerebrum never revived if the circulation had entirely ceased for five minutes. In the well-known case at Guy's, in which a child ultimately recovered after weeks of illness indicating the cerebral damage that had been sustained, it was reckoned on good evidence that 13 minutes elapsed between the collapse during anæsthesia and the moment when cardiac massage restored the circulation. Prof. J. A. Gunn, whose investigations into the condition of arrested circulation have been valuable, recommends that in performing cardiac massage the compression should be gradual and the relaxation abrupt, that the rate should be less than half the normal heart-rate, and that there should be interruptions at short intervals to allow spontaneous beats to develop. Prof. Gunn also recommends an intravenous injection of atropine after the heart has restarted as the best means of averting secondary stoppage from excessive vagal action which has been responsible for death after the primary circulatory failure has been corrected.

WE regret to announce the death of Mr. Charles Alexander Morton, emeritus professor of surgery in Bristol University and consulting surgeon to the Bristol General Hospital. His death occurred on Sept. 7th in Switzerland, where he was on holiday.

CHARTERED SOCIETY OF MASSAGE AND MEDICAL GYMNASTICS.—The Members' Congress will be held in London on Oct. 15th to 19th, all the lectures except the lantern lectures being given in the Great Hall of the B.M.A. House, Tavistock-square. Sir Henry Gauvain will give the first lantern lecture on The Treatment of Tuberculous Cripples: Sun and Sea Bathing, at 11 A.M. on Oct. 15th, at the Central Hall, Westminster, and the other lectures to be given at this hall include one by Mr. Naughton Dunn on Principles in the Treatment of Common Deformities at the same time on Oct. 17th, and one by Dr. A. F. Hurst on Asthma at 6.30 P.M. on Oct. 17th. Other lectures will be by Mr. H. Chapple on Twilight Sleep, Dr. Cicely M. Peake on Rheumatism in Children, Dr. Justina Wilson on Diathermy, Mr. P. Jenner Verrall on Low Backache, and Dr. G. J. Langley on Cardiac Insufficiency. Sir Cooper Perry will preside at the annual general meeting on the 19th, and the first annual dinner of the Society is to be held at the Café Royal, Regent-street, on Wednesday, Oct. 16th, at 7.45 P.M.

The Clinical Interpretation of Aids to Diagnosis.

A Series of Special Articles contributed by Invitation.

XLIII.—SIGNIFICANCE OF THE ACID-BASE BALANCE IN THE BLOOD.

PART II.*—DIAGNOSIS OF ACIDOSIS, ALKALOSIS, AND KETOSIS.

Acidosis.

WE have agreed to use the term acidosis for a condition in which the bicarbonate concentration of the body fluids is reduced by retention of acid or loss of base. The obvious method of detecting such a condition is to measure the plasma or blood bicarbonate. We have, however, to remember that the plasma or blood bicarbonate may be reduced in order to raise the cH towards normal when the free carbonic acid concentration has been reduced by overbreathing (type 1 (*b*)). In many cases there is no doubt as to which condition is present—for example, in diabetic ketosis in which we know that an excess of acids is being formed—but in other cases the answer is not obvious. For example, a moderate reduction of plasma bicarbonate, down to about 45 is found in anæsthesia; abnormal acid formation or retention sufficient to account for such a reduction has not been demonstrated, and it was at one time widely maintained that this reduction was the result of compensation for hyperpnœa. However, in these cases the range of pH is found to be below normal—that is, cH is above normal—which leaves no doubt that the reduction of $c(NaHCO_3)$ is primary. In cases of doubt, therefore, it is necessary to measure the pH of the blood as well as the bicarbonate.

Measurements of plasma or blood bicarbonate present several difficulties owing to changes in the blood on exposure to air or on standing, and it is advisable that the sample of blood should be taken by someone familiar with the technique; still greater precautions are required even for rough pH measurements.

As shown in Table II. last week there is always some compensatory reduction of free H_2CO_3 in acidosis, although the attempts at compensation may fail to bring the pH back to normal. If there is no interference with the respiratory exchange the alveolar air is in equilibrium with the plasma, so that the CO_2 tension in the alveolar air is proportional to the amount of CO_2 dissolved as H_2CO_3. Consequently the CO_2 tension in the alveolar air is reduced in acidosis; but, since the CO_2 tension is only reduced proportionally to the bicarbonate when the acidosis is fully compensated, it does not give such a good measure of the degree of acid retention as does the plasma bicarbonate. Also the patient's coöperation is needed in obtaining samples of alveolar air, which may be an insuperable objection. For these reasons estimation of the plasma bicarbonate is usually preferred. As set out in Table II. the amount of CO_2 per 100 c.cm. of normal plasma is 55 to 65 c.cm., while in conditions of acidosis it varies from 14 to 45.

Sellard's Test.—After taking 5 grammes of $NaHCO_3$ by the mouth a normal person usually excretes alkaline urine; but in acidosis the urine remains strongly acid (acid to methyl red) until enough $NaHCO_3$ has been taken to bring the plasma bicarbonate up to normal, which may require some 60 grammes. This gives a method of measuring the degree of an acidosis (Sellard's test) which is, however, rarely used.

Acidosis may be produced by any acid that is not poisonous in small concentration; the type most commonly seen among hospital patients is that due to retention of phosphoric and sulphuric acid in severe renal impairment. Such an acidosis usually occurs in cases of chronic nephritis with nitrogen retention as they approach the common end of all cases of this type, and may reach a severe degree as shown in Table II. of Paper I. The lowest pH recorded in man, 6·7, was found shortly before death in a patient with nephritis.

Alkalosis.

Failure of compensation, with consequent rise of pH, is usual in alkalosis, and the symptoms then are similar to those that occur in voluntary hyperpnœa and at high altitudes before accommodation is gained. Headache, dizziness, disturbed sleep, and a sense of weakness occur with the slighter degrees of elevation of pH; with more advanced degree, drowsiness, coma, tetany, and even general convulsions.

Alkalosis does not, like acidosis, occur in normal persons, and does not occur so often as a result of disease. It is caused by loss of hydrochloric acid in vomiting, particularly in the profuse vomiting that occurs with high intestinal obstruction or dilatation of the stomach due to other causes, and probably contributes to the extreme collapse in these conditions. On the other hand, alkalosis is more likely than acidosis to result from therapeutic measures, since the local effects of acids discourage their administration in large doses, the potential acids ammonium chloride and calcium chloride are unpleasant to take, while sodium bicarbonate which appears innocuous may be given in large quantities. When alkalis are given as a treatment for acidosis they should be stopped when the urine ceases to be strongly acid; it is best to use the indicator methyl red, which gives a red colour with a strongly acid urine (pH under 5·5).

Alkalosis can be detected and measured only by estimation of the plasma or blood bicarbonate, preferably with estimation of the pH as well. The CO_2 may rise to well over 100 c.cm. per 100 c.cm. of plasma. When large doses of alkalis are given, for example, in the treatment of pyloric ulcer, it is advisable to check the effect by plasma bicarbonate estimations; should this not be possible, it is necessary to watch for the symptoms of alkalosis—headache, nausea, weakness, and drowsiness.

The condition *alkalæmia*, an increase of the pH of the blood, can only be diagnosed with certainty by an actual estimation of the blood pH. So-called

TABLE III.—*Showing Results of Tests in Ketosis of Various Degrees of Severity.*

—	pH.	Bicarbonate c.cm. of CO_2 per 100 c.cm.		Acetone grammes per 100 c.cm. of blood.	Alveolar air.		Sellard's test. Grammes $NaHCO_3$.	24 hrs.: Urine.		
		Plasma.	Blood.		CO_2 tension mm. Hg.	CO_2 %.		$FeCl_3$ reaction.	NH_3 nitrogen grammes.	Acetone bodies as acetone, grammes.
Normal	7·30–7·45	55–65	46–64	0	38–49	5·0–6·4	5	0	0·14–1·1	0
Moderate	7·35	46	39	0·04	33	4·3	30	+	1·5	6
Medium	7·27	35	30	0·07	26	3·4	50	+ +	3·5	16
Severe (very drowsy) .	7·15	25	22	0·09	20	2·6	65	+ + +	5·5	25
Very severe (coma) ..	7·0	12	10	0·13	14	1·85	—	+ + + +	—	—

* Part I. appeared last week.

renal asthma is a condition of this type; the hyperpnœa is not brought on by acidosis but by an interference with the blood-supply to the respiratory centre, and occurs particularly in hyperpiesia.

Ketosis.

Ketosis, the appearance of acetone bodies in the urine, occurs particularly when the ratio of carbohydrate metabolised to fat metabolised is low; as in diabetes mellitus, starvation, and when the proportion of carbohydrate to fat in the diet is much reduced. It also occurs in fevers, especially in children, and to moderate degree in various other conditions, not uncommonly in normal pregnancy, and frequently in alkalæmia. It is undesirable that the term acidosis should be used for the appearance of acetone bodies in the urine, since this appearance need not be accompanied by any reduction of plasma or blood bicarbonate, and excessive formation or retention of acids may occur quite independently of the acetone bodies; also acetone bodies may appear in the urine in a patient with alkalosis. This is not merely a matter of nomenclature; Prof. A. E. Ellis has recorded the case of a drowsy patient in whose urine acetone bodies were found; the diagnosis of acidosis was made, and she was given sodium bicarbonate; as the ketosis became worse and the patient more drowsy, the sodium bicarbonate was repeated in heroic doses until she became comatose, developed tetany, and died. Shortly before death her plasma bicarbonate was found to be very high. It is very probable that this patient was suffering from alkalosis from the beginning.

Rothera's Reaction.

Ketosis is usually diagnosed by the detection of acetone and aceto-acetic acid in the urine. It is unfortunate that there is no qualitative test for β-hydroxybutyric acid, which is excreted in larger quantities than acetone and aceto-acetic acid in the more severe degrees of ketosis. The test that should invariably be used is Rothera's nitroprusside reaction, which is given by both acetone and aceto-acetic acid. The ferric chloride reaction which is given by aceto-acetic acid is also given by many other substances, particularly salicylic acid and its derivatives, such as aspirin. When present in small quantities the colours given by these substances are indistinguishable from that given by acetoa-cetic acid, and the methods for differentiating them are unsatisfactory. It is therefore advisable not to use the ferric chloride test unless the nitroprusside reaction is positive, and then to draw no conclusions if there is any likelihood that the patient has taken any such compound as aspirin.

In order to estimate the severity of a ketosis we may first estimate the amount of acetone bodies excreted in the urine. The straightforward estimation of the total acetone bodies is a long process not suitable for daily repetition. The depth of colour of the nitroprusside reaction gives some indication; if the colour is only pink the degree of ketosis is slight. The most popular index is the strength of the ferric chloride reaction. As might be expected the results are not very satisfactory, since the substance measured by this reaction is not the principal one excreted when the ketosis is severe. A definite reaction indicates that a large amount of acetone bodies (over 6 g. in 24 hours) is being excreted and a strong reaction that the amount is excessive; but a large amount may be excreted with no ferric chloride reaction.

An indirect estimate of the amount of acetone bodies in the urine can be obtained from the amount of ammonia in the urine, which is increased when the total amount of any acids excreted is increased; the parallelism between ammonia and acetone body excretion is particularly good. It is, of course, essential that the patient should not be receiving alkalis at the time, and that the urine should be collected with some preservative such as toluol, to prevent the formation of ammonia from urea by bacteria.

When substantially the whole of the 24 hours' urine cannot be collected, it is not possible to draw any conclusion from the ammonia concentration; some help may be given by the ratio of ammonia nitrogen to urea nitrogen; this ratio is normally about 1/30, and rises as the acid excretion rises; but it must not be forgotten that this ratio also falls when the protein intake is reduced, and no conclusions should be drawn unless the ratio is about 1/10; in extreme cases it may rise to unity.

Table III. gives examples of various degrees of ketosis. The amount of acetone bodies retained in the body fluids is of more importance than the amount that is being excreted harmlessly in the urine. A moderate amount may be excreted without any appreciable retention, and patients vary greatly in the relation between amounts excreted and amounts retained. The straightforward estimation of acetone bodies in blood is too long for repeated use. If the patient is not taking alkalis the plasma bicarbonate will give an indication of the degree of retention and has been largely used; but the bicarbonate reduction is not necessarily proportionate to the amount of acetone bodies, as other acids besides β-hydroxybutyric and aceto-acetic may be formed.

As a rough quantitative measure the nitroprusside reaction may be applied to the filtrate obtained in the Folin-Wu method of sugar estimation; a pink colour developing in about 15 minutes shows an excess of acetone bodies. This test might well be used more generally.

JOHN R. MARRACK, D.S.O., M.D. Camb.,
Chemical Pathologist to the London Hospital.

DONATIONS AND BEQUESTS.—Mr. Mark Firth, of Carlton-park, Northampton, left £1000 to Firth's Almshouses, Sheffield, and £100 each to the Royal Infirmary, Sheffield, the Royal Hospital, Sheffield, the Jessop Hospital for Women, Sheffield, the Free Hospital for Sick Children, Sheffield, and the Kettering Hospital.—The late Miss Marianne Hamilton, of Maelog Cottage, Beaumaris, Anglesey, left, among other bequests, £1200 to the Royal Alexandra Convalescent Home, Rhyl; £1000 each to the Anglesey and Carnarvonshire Infirmary, the Society for the Prevention of Cruelty to Animals, Dr. Barnardo's Homes, the Mission to Lepers, the Church of England Zenana Missionary Society, the Oldham Deaf and Dumb Institution, and the Oldham Home Teaching for the Blind; and £500 to the Beaumaris and District Nursing Association. The residue will be divided between the Royal United Kingdom Beneficent Society, the Oldham Royal Infirmary, Henshaw's Bluecoat School, Oldham, and the Northern Hospital for Incurables, Mauldeth, Manchester.—Mr. Charles Wellington Polkinghorne, of The Terrace, The Hoe, Plymouth, left £500 each to the South Devon and East Cornwall Hospital and the Royal Albert Hospital.—The Governors of the Manchester Royal Infirmary have received a legacy of £5898 from the late Mrs. M. A. Gratrix, and one of £1000 from the late Mr. Edwin Ogden.—On the decease of a legatee, Mr. William Malin, J.P., of Overdale, Derby, left £600 to the Derbyshire Royal Infirmary for the endowment of a cot in memory of his son. Mrs. Virginia Schilizzi, of Paris and of Athens, and Highgate, London, left £1000 to King Edward's Hospital Fund for London, and £500 each to Westminster Hospital and the Grosvenor Hospital for Women and Children, Vincent-square, London, S.W.—Mr. George Brookfield, of Queen's Drive, Mossley Hill, Liverpool, left £500 each to the Child Welfare Association, Liverpool Hospital for Diseases of the Heart, Liverpool Children's Hospital, and the Boys' Home and Refuge, Liverpool. One-half of his residuary estate is to be divided between the Liverpool Royal Infirmary, the Liverpool Hahnemann Hospital, the George Walker Memorial Hospital, and the Liverpool Central Relief Society.—Mr. Frank Walker, of Normanton-road, Derby, left £500 each to the Derbyshire Royal Infirmary, the Derby and Derbyshire Hospital for Sick Children, and the British Empire Cancer Research Society.—Mr. Thomas Lewis, of Haslingden-drive, Bradford, left £150 to the Leeds General Infirmary "as a grateful appreciation of the successful serious operation performed upon me by Dr. Littlewood at the infirmary" and £150 to the Bradford Royal Infirmary.—Mr. Joseph Cottrell, of Rugeley, Staffs, left, on the death of his wife, £1000 to the Derbyshire Royal Infirmary for the endowment of two beds in his name and £1000 to the Stafford General Infirmary for the endowment of two beds in his name.

Special Articles.

ON THE VALUE OF TONSILLECTOMY

IN THE PREVENTION OF ACUTE RHEUMATISM, RHEUMATIC CARDITIS, AND CHOREA.

BY N. GRAY HILL, *M.C.*, M.B. LOND., D.P.H.,

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IT is very widely held that the tonsils are the portal of entry of the hypothetical causal organism of rheumatic fever, and Poynton's declaration "I am convinced by clinical and experimental evidence that the tonsils are the site of access; statistics will not shake me in this belief," clearly defines the attitude of a number of medical men who have had wide experience of the rheumatic disease. Further, it is commonly claimed that the tonsils of rheumatic children are unhealthy and show evidence of chronic or subacute inflammation.

The theory that the infection enters by the tonsils is difficult either to prove or disprove. Until a definite organism can be incriminated, satisfactory experimental evidence cannot be obtained, and it must be remembered that although a fairly strong case has been made out by certain investigators against various streptococci, no organism is as yet generally accepted by the bacteriologists as the specific organism. The statement that the tonsils of rheumatic children are in a worse condition that those of their healthy brethren may be true, but unhealthy children tend to have unhealthy tonsils and a fundamental relationship between the tonsil and the disease from which the child suffers is not thereby proved. At the Bath Conference on Rheumatism Wilfred Vining stated that in his experience tonsillitis and sore-throats are as commonly met with among non-rheumatic as among rheumatic patients, and MacSweeney published figures, collected while examining school-children in Cardiff, that suggest that the alleged association between enlarged and septic tonsils and acute rheumatism does not exist. Boas and Schwartz, in a paper on the modes of infection in rheumatic fever, regard the tonsils as playing a relatively minor rôle as a source of infection, and other workers, both in this country and in America, have shown that there is not such a marked difference between the tonsils of rheumatic children and others as to warrant the dogmatic statement that the tonsils of rheumatic children are hypertrophied and either acutely or chronically inflamed.

Some Published Investigations.

But even if the tonsils were the common portal of entry it is questionable if the permanent closure of a gate after an enemy has entered will save the city. Schichhold, in a paper published in Munich in 1910, claimed that the removal of the tonsils would cure an attack of rheumatic fever and prevent recurrences, and this hypothesis has been accepted by many. Robey and Freedman endorsed it. They concluded from their investigation of 454 cases that complete enucleation is the best preventive treatment for rheumatic fever and endocarditis, and considered that tonsillectomy should be performed when there is a history of sore-throats, even when the tonsils appear normal, and when the tonsils appear diseased, even though sore-throats are absent. They refer to the beneficial results they obtained by tonsillectomy conducted during the height of an attack of acute rheumatism. Kerley, writing in February, 1929, asserts that the tonsils should be immediately removed from a patient suspected of having rheumatism, regardless of whether they appear healthy or not. Reginald Miller is of opinion that tonsillectomy is of great value in preventing arthritis and all forms of carditis, but that it leaves chorea totally uncontrolled. This suggestion is also supported by the findings of the Medical Research Council. In its report it is stated that it is curious to note the preponderance of attacks of chorea over other forms of rheumatic manifestations in 60 persons whose tonsils had been removed; 36 of these developed a first attack of rheumatism some time after the removal of the tonsils and had it in the form of chorea only, four others had chorea as well as other manifestations. A. P. Thomson states that tonsillectomy is advised in all children admitted to the rheumatic hospital at Baskerville unless definitely contra-indicated, and he holds that the value of early and complete tonsillectomy in the prevention of rheumatic heart disease is definitely established.

As opposed to this view we have the statement made by Poynton at the discussion on rheumatic infection in children at the B.M.A. meeting in Bath in 1925. He said: "I know that skilled enucleation will not prevent a first attack of rheumatism and acute carditis of extreme severity occurring years later, and I know also that an acute and crippling attack of carditis may directly follow removal of the tonsils in the rheumatic." Wilfred Vining, dealing with debilitated and pre-rheumatic children said: "I have seen children whose debilitated state seems to date from the removal of their tonsils and adenoids, and a recent review of cases has increased my belief that the routine removal of the tonsils and adenoids is a mistake," and in his paper given at the Bath Conference he referred to children he had had under his personal observation who developed the first attack of rheumatism after the tonsils and adenoids had been removed. Hunt and Osman reviewed the after-histories of 144 rheumatic children treated at Guy's Hospital, 66 of whom had had their tonsils enucleated, and they concluded that the operation did not diminish the liability to rheumatic infection and that to operate upon apparently healthy tonsils was quite unjustifiable and could not be too strongly condemned. Among the rheumatic children investigated by MacSweeney in 12 cases the removal of the tonsils was antecedent to the first attack of rheumatism, and yet six of these children developed endocarditis. Dr. May Wilson and others kept careful records of 413 rheumatic children that were under their observation between the years 1916 and 1927, some of the cases being under observation all through this ten-year period. 247 were subjected to tonsillectomy, and the results as judged by the occurrence and recurrence of manifestations of infection after operation lead to the conclusion that tonsillectomy is not advisable as a routine therapeutic measure for the prevention of rheumatic heart disease, and that advocates of the operation do not base their claims on conclusive data.

Author's Inquiry into After-histories.

During the last two and a half years over 400 rheumatic children have been under treatment at Queen Mary's Hospital, Carshalton. With the help of Miss Mary Allan, M.A., I have made a résumé of the histories and case-notes of all these patients and the records of their progress after discharge for a certain number of the children who have been under the supervision of the London County Council. In Table I. are recorded certain facts referring to the first 300 rheumatic children admitted to this hospital, who had had no operative interference with their tonsils.

TABLE I.—*300 Non-tonsillectomised Cases.*

		Per cent.
Developed endocarditis	176	58·7
,, chorea	103	34·3
,, both endocarditis and chorea	57	19·0
,, other rheumatic signs	235	78·3
Deaths	17	5·7

In Table II. is set out information about the cases that appear to have had their tonsils removed in a satisfactory manner either before the onset or during the very early stages of the rheumatic disease.

TABLE II.—*50 Tonsillectomised Cases.*

		Per cent.
Developed endocarditis	29 =	58
,, chorea	16 =	32
,, both endocarditis and chorea	8 =	16
,, other rheumatic signs	40 =	80
Deaths	2 =	4

Over 60 cases have had to be excluded from the above tables either because the tonsils were incompletely removed or because the operation was carried out after endocarditis was established and the influence of the operation could not be fairly judged. The very variable behaviour of every case makes it very difficult to record in any simple way the complications and clinical course of rheumatism in the child. In the Metropolitan Asylums Board report of 1928–29 short case-notes of many of the patients here referred to are given, but this method is somewhat cumbersome, and it is hoped that the tables will be sufficient to indicate that tonsillectomy, even when carried out in a satisfactory manner during the early stages of the disease, does not appear to have any great influence on the behaviour of rheumatism and is no safeguard against either carditis or chorea.

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THE STATE OF THE PUBLIC HEALTH.[1]

THE Annual Report of the Chief Medical Officer of the Ministry of Health for 1928, of which a preliminary review was published in THE LANCET of August 31st (p. 480), is, as usual, packed with information set out in a way which cannot fail to interest.

Sir George Newman poses six questions to which every State and every local authority must seek the answer; the State or authority which knows the most economic and effective answer will excel. These questions are: How is an imperial race to be reared? How are children to be nurtured so as to grow up into healthy and productive adults? How are healthy men and women to retain their physical and mental health, and grow in grace, knowledge, and capacity? How are the sick and diseased to be treated in such a way as to enable them to return, healed as soon as possible, to the ranks of workers and breadwinners? How, in the last resort, is disease to be prevented? How are dysgenic forces (which are undermining racial health) to be defeated, and human existence controlled? To find the answer is, he says, among the supreme tasks of government in every country; it is a problem of permeating the whole art of government with the established knowledge of science and inspiring it with humanism, a biological process which demands all the faculties and powers of man's body and mind for its accomplishment. "Preventive medicine means the organisation of human nurture. Nothing is more certain than the fact that the physical advancement and health of mankind is dependent, not upon a 'doctor's stunt,' here, or a 'sanitary institution' there, but upon the whole social environment and evolution of the people." He lays down four basic principles as foundation for a national system of preventive medicine. First there must be ascertainment and accurate registration, for without statistics we cannot even begin to measure the value of methods or results. Secondly, there must be a standard of health and physiology, and we must understand the relation of man's whole environment to the normal physiology of his body, and to departures from its standards. Thirdly, we must have an ever-increasing knowledge of the nature, character, and incidence of disease, the social factors which modify it, and its mode of spread, treatment, and prevention. Fourthly and lastly, there must be national organisation. The proof of the validity of the medical ideal is essential to its wide adoption; its acceptance depends upon the assent of the people, its application calls for public money, and its administrtion for public representatives.

[1] Annual Report of the Chief Medical Officer of the Ministry of Health for 1928–29. H.M. Stationery Office. Pp. 295. 3*s*.

Maternal Welfare.

The year 1928 was marked by considerable increase of interest in the problems that concern mother and child, and the Ministry of Health is to be congratulated on the success of its efforts to awaken the profession and the general public to the need for a more complete and adequate maternity service. The maternal death-rate has shown no substantial reduction since 1911, and although this static position may be more apparent than real, it emphasises the need for continued effort. Puerperal sepsis accounted for 1184 of the 2920 maternal deaths, and this figure must be regarded as a certain understatement of the deaths due to puerperal infection. It seems to be generally conceded that every pregnant woman should have ante- and post-natal examination by a medical practitioner, the attendance of a qualified midwife during labour, and the services of a doctor if any abnormality arises. A scheme of this sort would, it is hoped, abolish the "handy woman," and secure cöoperation rather than competition between doctor and midwife. The number of antenatal clinics approved by the Ministry increased during the year, but their standard of efficiency unfortunately is not always as high as it should be. Obviously attendance at an unsatisfactory antenatal clinic may be a positive danger, and the Maternal Mortality Committee have prepared a memorandum setting forth the principles and organisation required to bring an antenatal centre to the minimum standard of adequacy. This memorandum, which was summarised in THE LANCET of August 10th, p. 295, is printed in the Report, and will, it is hoped, be studied carefully by all authorities.

There is still a shortage of maternity beds; at the end of April, 1929, there were 2480 beds recognised by the Ministry. The Report takes a conservative attitude towards the recommendation that every baby should be born in a hospital of some kind. While hoping that there will soon be enough beds to supply every woman who wants one, the Ministry feels that for a long time to come the great majority of births will take place in private houses, and that the improvement of domestic midwifery is therefore its first concern. Moreover, without an extremely high standard of treatment, and a lively appreciation of the risks of puerperal infection, the congregating of a number of parturient women in one place paves the way to an outbreak of sepsis, which could never occur if the patients were segregated in their own homes. The Report gives, as a warning, an account of some outbreaks of puerperal fever in maternity homes, and emphasises the importance of searching for unwitting carriers of hæmolytic streptococci in the nasopharynx. It is hoped that the reorganisation of space under the Local Government Act may allow for the formation of larger and better-equipped maternity units. Now that motor transport is available all over the country, one unit can serve a very large area, and small maternity homes can be linked administratively with the large centres. Although the training of medical students has greatly improved during the last decade, it is by no means universally satisfactory, and there is practically no provision for post-graduate work in midwifery. The Report urges obstetric specialists to pay special attention to this aspect of the problem.

A committee was appointed in the summer of 1928 to consider the training of midwives, and the conditions of their work. Their report will be published shortly.

The committee on maternal mortality, appointed at the same time, is a standing committee to survey the whole field of obstetric practice, and from time to time to make suggestions to the Ministry. It has three subcommittees—clinical, public health, and research. Its first duty was to advise on the investigation into maternal deaths, and two medical assessors were appointed for this purpose. The response made to the request for investigation has been very satisfactory; up to the end of last June English medical officers of health had sent in 282 reports for 1928, and 869 reports for 1929.

Infant and Child Welfare.

On April 1st, 1929, there were 2522 recognised infant welfare centres in England, an increase of 91 during the year. There are 4131 whole or part-time visitors. The new regulations making an approved certificate a condition of the Ministry's approval came into force on April 1st, 1928, and caused a certain amount of difficulty in filling vacancies. There are many more students training this year than last, but local authorities are urged to facilitate schemes for training, and to arrange attractive conditions for service. There are the same number of beds for infants as last year, and there are now 98 day-nurseries and 104 homes for unmarried mothers and their babies, 95 of which receive grants. The mothers stay about six months in the homes, which provide accommodation for 1480 women and 1340 babies. The Ministry also recognises 34 residential homes for orphaned or illegitimate babies. Arrangements have recently been made at Chailey for the reception of babies suffering from malnutrition and similar ailments; the results have been very satisfactory.

The Report remarks that the infant mortality-rate will not continue to fall unless more and more means of securing infant health are discovered and applied. The Health Committee of the League of Nations set up a committee to consider infant welfare, and under their ægis a year's investigation was made into stillbirths and neonatal deaths in selected districts in Germany, Austria, France, Holland, Norway, Italy, and England. Very much the same returns were obtained from all these areas. Everywhere the great majority of deaths fall into three groups: (1) stillbirths and neonatal deaths due to prematurity and obstetric trauma; (2) gastro-intestinal diseases; (3) respiratory diseases.

The second group is the most preventable, and can be reduced to a negligible factor in districts where care is taken. The first group accounts for about two-thirds of all infant deaths, and is not showing any appreciable diminution. Our means and methods of preventing respiratory disease are by no means adequate, and call urgently for improvement.

The time has undoubtedly arrived for a very special effort to discover and deal with the defects and diseases of children between one and five years of age. More facilities are needed, and more attempts should be made to persuade parents to take advantage of them. The most critical period is probably that of weaning and just after; the mother has neither time nor knowledge to see that the difficult process of transition from babyhood to childhood is mitigated. Frequent visits to a consultation centre are most desirable for the infant, but by no means essential for the older child, and what is needed is some scheme which will help the mother to make the best use of her own resources, and to supplement these resources when necessary. In 1924 an investigation into the health of pre-school children was initiated, with the help of medical officers of health and voluntary centres. A number of children in three groups have now been kept under observation for three years, and nearly 2000 case sheets are available for statistical investigation. The three groups were: (1) average unselected children attending a centre; (2) "catarrhal" children attending a centre; (3) two or more children in the same family. The results of an investigation at Guy's Hospital into the causes of catarrh are summarised. It was found that 1016 catarrhs were suffered by 370 children, and the greatest proportion (an average of 3·1 per child) occurred in the second year of life. The resistance during the first year is ascribed partly to breast-feeding but primarily to fresh air. The infant can be left out of doors most of the day, but the toddler needs constant supervision, and is often taken out only when the mother goes shopping. In the third and fourth years the children can be allowed out by themselves. The correlation between the amount of fresh air and the average number of catarrhs per child is very striking. Children who were grouped as having a good deal of fresh air showed an average of 1·82; those who had a moderate amount of 3·11; while those who had little air were small, pale, waxy babies, with soft limbs, protuberant abdomens and snuffling noses, or fretful toddlers with thick lips, narrow chests, poor muscles, bad appetites, and disturbed sleep, and showed an average of five colds per child.

The Insurance Medical Service.

The post-war years have formed a period of steady development of efficiency and growing mutual confidence. The Report points out once again that the "panel doctor"—sometimes criticised as though he were some strange genus—is only an ordinary general practitioner, who has chosen to devote part of his time to general practice among insured persons. The great majority of doctors in England and Wales are panel doctors, and the treatment they give their insured patients does not differ from that which they give to their private patients. The Report also explains how insurance practice can be carried out with less clerical work than is normally necessary in a well-conducted practice. The number of insured persons entitled to medical benefit in 1928 was 14,814,000, more than one-third of the total population. The number of insurance practitioners was 15,276, and the number of prescriptions dispensed by 9688 chemists was 54,455,557. Exclusive of administrative expenses, the cost of medical benefit was £9,073,080, of which about £2,241,780 were spent on medicines and appliances. The extraordinary rarity of serious complaints throughout such an immense service, which is run without any system of clinical inspection, is a striking testimony to the high standard of professional conduct which Sir George Newman believes to be "an outstanding feature of British general medical practice." During 1928, an important extension was made in the coöperation of the medical profession on the "disciplinary" side of the service. When a practitioner is adjudged by an Insurance Committee to have failed to fulfil his obligations, either party may appeal to the Ministry of Health. In considering these appeals, the Minister is now advised by a committee consisting of the Chief Medical Officer and two other medical officers of the Ministry, and three doctors selected from a panel nominated by the Insurance Acts Committee of the British Medical Association. Moreover, any officer who is appointed to hear an appeal has sitting with him a practitioner selected from this panel. During 1928, the practitioner was exonerated in most of the 299 cases of complaint investigated. Remuneration was withheld in 42 cases only, and no formal representations were made that a practitioner should no longer remain on the list. Remuneration was also withheld from eight practitioners who had failed to keep medical records, and from five who had failed to supply the regional medical officer with necessary information. It is hoped that the cost of prescribing may be reduced by the preparation of a single formulary for use throughout the country, and this formulary has now been prepared by a special subcommittee. Practitioners will also very soon be supplied with a quarterly statement of the principal statistics of his own prescribing, with a comparison of the cost per prescription per person with the average cost incurred by all the practitioners in the area.

There have been several conferences to consider the steady increase in the number of claims for benefit, and various changes in the certification rules are under discussion. It has been agreed that a common form of notice should be used for all patients who are referred to a regional medical officer, and that the source of reference should not be stated, so that patients will not know if the doctor has referred them as doubtful; that the certificates issued to doctors should be consecutively numbered, so that it is possible to ascertain the number of certificates issued by each practitioner; that statistics should be prepared of the number of patients referred to the regional medical officer by each practitioner, and of the proportion of them who consequently cease to draw benefit, and that any doctor who appears from these figures to be exercising insufficient care in certification should be approached in the matter, and that if his explanations appear unsatisfactory, the Minister should refer the matter to the panel committee for disciplinary action.

The attempt to provide post-graduate facilities met with indifferent success, and only 89 practitioners attended courses of instruction during the year. Additional efforts are being made to increase the number in 1929. More and more cases are being referred to the Regional Medical Staff, which now consists of 59 officers, eight additional deputy regional medical officers having been appointed.

By the National Health Insurance Act, 1928, two new benefits were provided: payment for medical or surgical advice or treatment outside the scope of any other benefit, and payment to approved charitable institutions for treatment outside the scope of ordinary benefit, both additions being under a special ad hoc scheme. The sum of £2,500,000 was allocated to dental benefit during 1928, and about £400,000 to ophthalmic benefit. The Regional Dental Service began its work in March, 1927, and 27,684 cases were referred to it during 1928. Two additional regional officers and 20 part-time referees were appointed.

NATIONAL VETERINARY MEDICAL ASSOCIATION.

ANNUAL MEETING AT AYR.

Dr. O. Charnock Bradley, Principal of the Royal (Dick) Veterinary College, Edinburgh, presided at the annual meeting of the Association held last week at Ayr, when delegates were present to the number of about 200, including representatives of the United States, Canada, Australia, New Zealand, and Japan. Dr. Bradley surveyed the great developments taking place in every phase of veterinary science and practice, especially the growth of animal research. In the seven years since he last presided over the Association, an Institute of Animal Pathology, under Prof. J. B. Buxton, had arisen at Cambridge, and an Animal Diseases Research Association in Scotland, with an Institute of its own. At the same time there had been a rapid and remarkable increase in the number of public appointments, the veterinary staff of the Ministry of Agriculture had been augmented, most important of all was the growth of an army of county and municipal veterinary officers The country was beginning to realise the importance of veterinary science in the protection of the health of the people. Dr. Bradley described the efforts to build up an adequate veterinary service in the colonies and dominions, where the supply was below the demand. The recommendations of Lord Lovat's committee were likely to have a profound effect on veterinary education generally. He expected that the report would induce more men of university standing to enter the veterinary profession. Uneasiness as to bovine tuberculosis was growing, and he thought the time had come to form a consensus of practical economic and academic opinion as a comprehensive basis for future action.

Carriers of Foot-and-Mouth Disease.

Mr. J. O. Powley, M.R.C.V.S., of the Ministry of Agriculture, made some striking suggestions about the sources of foot-and-mouth disease. In a recent outbreak investigated by the Ministry, lesions were found on the feet of rats. The Research Committee is pushing this point to a finish, but the viability of the virus and its easy destruction are two factors of difficulty. Feeding pigs, poultry, and cattle with crushed, imported marrow-bones has resulted in outbreaks, and presents another channel of inquiry. About 50 to 60 per cent. of the bone for making bone-meal came from South America. It was always fresh and, therefore, always dangerous. There had been reports of human beings suffering from this disease; but he knew of no steps taken to verify the diagnosis. Foot-and mouth disease is still full of unresolved problems; fortunately the incidence on human beings is small, and the "slaughter" method is practicable with animals. But something more scientific is wanted and expected.

Tuberculin Testing.

Prof. Buxton described the methods of applying the tuberculin test to herds, giving facts which, after all these years, are disconcerting. He considers that the double intradermal method gives almost 100 per cent. accuracy. The subcutaneous method is notoriously unreliable. Everyone must agree that the tuberculin itself should be standardised for animal testing as it is, under the Therapeutic Substances Regulations, for human application. Until this is done, reliable results can hardly be expected. The Medical Research Council has already surveyed the field. Obviously, too, the skill needed for carrying through the test is underestimated.

Mineral Requirements of Farm Animals.

Dr. J. B. Orr, director of the Rowett Institute for Research in Animal Nutrition, said that of the non-energy-yielding constituents, those required in largest amounts were calcium and phosphorus. They not only formed the main elements in the skeletal structures, but were present as essential components of every living cell. Pigs on a diet deficient in calcium developed symptoms resembling tetany in children, a condition in which the blood-calcium had been shown to be definitely below normal. The evidence which could be brought forward in support of the hypothesis that deficiencies of calcium and phosphorus in the food led to decreased resistance to certain diseases was much too meagre to enable them to draw any conclusions. It was sufficient, however, to stimulate further investigation. The bearing of diet on resistance to infectious disease was a research problem for human as well as for animal preventive medicine; but the most enlightening work had been done on farm animals. The field for observation was much wider in the animal world. The ideal combination for research would be team-work between the veterinary clinicians and the physiologists.

Prof. J. Russell Greig, of the Royal (Dick) College, said that the presence of calcium in the organs was of prime importance against toxins. Stiffness in race horses after the severe exercise of galloping was due to the calcium being rendered non-available. On recent evidence he had no hesitation in saying that calcium deficiency was the cause of milk-fever in cows, and he suggested that the heavy losses through sterility might be associated with the same cause.

Calcium and phosphorus metabolism are already occupying the energies of many investigators. It is pre-eminently a case for the collaboration Dr. Orr suggests. Given the adequacy or deficiency of calcium and phosphorus, the controlling factor is still to seek, just as in the case of the blood-sugar. But full advantage should and will be taken of the facilities available at institutes for animal research like the Rowett.

The next annual meeting of the Association will be held in London, before the opening of the International Veterinary Congress there, in August, 1930.

MEDICINE AND THE LAW.

Drugging the Truth out of Suspects.

A FEW days ago fresh reference appeared in an evening newspaper to the possibility of obtaining evidence in criminal trials by administering drugs to a prospective witness and thereby throwing him off his guard and enabling admissions to be extracted from him while he was at a disadvantage. This idea of applying to the detection of the criminal an experience acquired in obstetrical practice has already been discussed in THE LANCET more than once. In 1922[1] mention was made of a paper read by Dr. E. House, of Ferris, Texas, before the State Medical Association of Texas on the Use of Scopolamine in Criminology. An extraordinary attempt to turn this method to account was described in our pages a year ago when[2] "a heavy injection of hyoscine hydrobromide" was reported to have been administered to a suspected murderer in Hawaii. The Royal Commission (presided over by Lord Lee) on Police Powers and Procedure quoted our account of the Hawaii incident in its report last March in connexion with a discussion of so-called "Third Degree" methods of extracting evidence. The etymology of the expression "Third Degree" is a little obscure. According to an American authority the "First Degree" occurs when the officer of the law puts inquiries upon arrest, the "Second Degree" when the arrested person is taken to the place of confinement, and the "Third Degree" when that person has been taken into private quarters and there interrogated closely as to his movements or as to the bloodstains upon his clothing, &c. As was stated in our columns a year ago the system of extracting evidence with a hypodermic injection is so utterly alien to the British methods of police and criminal procedure that its adoption in this country is unthinkable. We have evolved an elaborate formula for warning an accused person that what he says in answers to police questions may be taken down in writing and used against him. This system of giving a "caution" is entirely inconsistent with any idea of catching a man off his guard. It has sometimes been suggested in criminal trials on behalf of the accused that the police have extracted some information from him by acting contrary to the spirit, if not also to the letter, of the prescribed procedure. Where such an abuse has occurred, there is no doubt that English juries will have seen to it that the interests of the accused do not suffer thereby. The Lee Commission was convinced that a criminal court does want to know what an accused person has said upon arrest or upon the charge being read over to him. The Commission sought to ensure that no such statement should be used at trial unless the accused had obviously been willing to make a statement and unless the statement was accurately recorded. The Commission recommended, therefore, that an accused person, expressing a wish to make a voluntary statement, should be cautioned (i.e., should be warned that he is not obliged to make any statement, but that, if he does, it may be given in evidence), should be offered writing materials, and should be left to write it without being overlooked, questioned, or prompted. If he declines to write the statement himself then—the Commission suggested—he should, as a new and additional safeguard, be required to write out in his own hand a request to the following effect:—

"I, A. B., having been cautioned that I am not bound to say anything, and that what I say will be given in evidence, wish to make a statement, which I have asked Sergeant C. D. to write down for me."

Such a request, it was recommended, should be signed by the accused person, who should add the time and date of its being written. His statement should then be taken down by the police officer in long-hand as nearly as possible in the actual words used, with a special precaution limiting the asking of questions by the police to remove ambiguities. Further, the accused should be given ample time to read and re-read his statement with a view to correction—ample time meaning several hours or even next day; and any prisoner who wishes to make a statement should, if he desires, be entitled to have his legal adviser present and to be supplied with a copy of what he has said.

These recommendations require no statutory confirmation; they merely set up a standard of fair play in administrative procedure; they do not greatly differ from the practice already operative in many of our police forces. The breadth and reasonableness of them show how impossible it is for our criminal methods to tolerate any idea of drugging the truth out of an accused person.

[1] See THE LANCET, 1922, ii., 1082, 1190.
[2] See THE LANCET, 1928, ii., 990.

BERLIN.

(FROM OUR OWN CORRESPONDENT.)

Influence of Caffeine on Fertility.

Prof. H. Stieve, of Halle University, writing to the *Medizinische Welt*, reports on experiments made by him on the influence of caffeine on the procreative capacity. Using rabbits of the Russian species he made three series of experiments; in one he gave caffeine to male rabbits and then mated them with female rabbits; in another group he gave caffeine to females only and not to their mates; and in the third he gave caffeine to female rabbits who had previously been impregnated by non-caffeinised male rabbits. In the first series a quantity of 0·025 g. for each kilogramme of body-weight had no influence on the sexual impulse even if given daily for a period of six months; but of 71 young rabbits born at the proper time 54 (76 per cent.) died within the first week. Male rabbits may, however, become accustomed to the caffeine, since among rabbits receiving 0·1 g. daily all but one out of 42 young remained alive. Female rabbits are more sensitive to the drug than male ones, since in the second series 72 per cent. of the young died or were born dead. In the third series, where the females were given caffeine during pregnancy, only 72 per cent. of the expected litter were born. Of the surviving male brood some showed early disappearance of the sexual impulse. Prof. Stieve concluded that caffeine has a toxic effect on the generative glands. In females dying from chronic caffeine poisoning degeneration of the ovaries was found, while in males the formation of semen was found to have ceased. As far as man is concerned such large quantities in relation to weight as given in these experiments are never consumed. A daily consumption of 4–5 large cups of strong coffee would be less than a tenth of the quantity which poisons rabbits. But as the human species is much more sensitive to caffeine than are rabbits, the author is of opinion that regular consumption of strong coffee has a deleterious effect on the generative capacity even if it does not prejudice the general health. He believes that a part of the undesired sterility observed in many civilised nations is due to the injury done to the generative glands by caffeine together with other toxic substances. Since mental strain is liable to prejudice the sexual impulse and since brain-workers are inclined to drink strong coffee, the cumulative effect may produce sterility.

Cost of Foodstuffs.

The Hamburg Statistical Office has made an interesting research into the cost of food of an average family of the lower middle classes. They distributed household account books to 300 Hamburg families of teachers, lower grade civil servants, employees, and skilled workmen who had agreed to record daily in the appropriate columns the money expended during a year on foodstuffs. It was recorded that the nutrient value of the food was on an average adequate.

The protein foods in the form of fish, meat, cheese, and bread amounted to roughly 74·6 per cent. of the total purchase, and must be regarded as lavish according to modern views. Fat was consumed per head in a quantity of 106 g. instead of the 60–70 g. which are adequate. Of vegetables only 404 g. were taken daily instead of the 500 g. which must be regarded as satisfactory, for the cost of vegetables is not small. Every family spent on an average 347 marks for 148 kg. meat, while only 39 kg. of fish were used at a cost of 38·5 marks. This is the more astonishing, as Hamburg is situated near the sea, and the cost of 10 g. of protein in form of fish is only 5·7 pfennigs, while meat of the same nutrient value would cost 11·7 pfennigs. The Hamburg Statistical Office states that by a larger consumption of fish the importation of meat from abroad would be considerably reduced.

Prophylaxis of Diphtheria.

Immunisation of children has been going on briskly in Berlin since 1926, when an epidemic of diphtheria occurred in a rather severe form. According to a report of the Municipal Health Office, more than 100,000 children have been protected. Two kinds of prophylactic were used, the Hoechst and the Behring antitoxin. The younger the children were the better was the injection endured. Apart from the local reaction, some children showed a general reaction which consisted in an increase of temperature for 2–3 days and sometimes a rash. Very few undesirable phenomena were recorded; a paresis of the arm of a girl was reported by her mother, but could not be detected some hours later and was thus probably of a hysterical character. A boy showed swelling of the axillary glands with a passing albuminuria, and another boy had a swelling of the cervical glands with a temperature of 40° C. and hæmorrhagic diarrhœa. All these children recovered and no permanent harm was done. The morbidity of the immunised children was only one-third of the general morbidity of diphtheria. The report insists on the need for two or three inoculations, with an interval of two or three weeks between each.

Birth Injuries.

Dr. Vogel, of Leningrad, has been investigating the importance of injuries received by infants during delivery. He has communicated a full statistical report to the *Monatsschrift für Geburtshülfe* on all the deliveries in the Leningrad Maternity Hospital from 1908 to 1927. In 34 per cent. of all the deaths of infants during delivery cerebral hæmorrhage was found at autopsy and hæmorrhage of the abdominal organs in 8 per cent. of the rest, so that hæmorrhage was found in 42 per cent. Injury was the cause of death in 50 per cent. of the still-births or premature births. Injuries are especially dangerous to fœtuses with lessened resistance; in breech presentations the proportion of mortality due to injury is still higher. The prophylaxis of injuries must consist in a reduction of operations, conservative treatment being in the interest of the child as well as of the mother. The author concludes from his investigations that delivery lasting even as long as 24–48 hours gives better chances of survival than operations.

Abuse of Medical Publications.

The Syndicate of the German Medical Press utters a warning against the indiscriminate recommendation of new drugs and compounds. The committee have long ago taken measures against that nuisance so that their columns are now open only to reports founded on personal experience. Certain publishers, however, not belonging to the Syndicate, find means of recommending drugs and compounds to the profession in an unfair way. A publishing firm, for example, advertises a filing system where certain drugs are inserted with indications for their use if the producer pays a sum varying from 200 marks upwards. Another firm publishes an annual for patent medicines which, according to the prospectus, is sent free of charge to every German medical man. A medical man who runs a risk of prosecution is the editor of a therapeutic manual who sends circular letters to the pharmaceutical factories asking them whether they are willing to have their products mentioned in the manual and if so if they are willing to pay for an insertion which will not be in the form of an advertisement. The medical profession is warned against such insidious advertisement.

Accident Insurance of Medical Staff.

The recent amendment of the State Accident Insurance Laws extends the clauses of that law to the staffs of hospitals, clinics, medical laboratories, and to every person employed by a medical man as assistant (qualified or otherwise), attendant, or servant. Every medical man employing such persons is regarded as an employer under the Act and must have his personnel registered for insurance purposes. Hospitals and the medical profession form a State insurance body after the pattern of the long-existing industrial employers' associations, which have to treat and to indemnify the injured. The contributions will be low and will be collected from the individual member of the profession by the medical chamber together with the other contributions payable to the chamber.

AUSTRALIA.

(FROM OUR OWN CORRESPONDENT.)

Dr. Colin Mackenzie's Knighthood.

THE conferment of a knighthood on Dr. Colin Mackenzie has been accorded the whole-hearted approval of medical and scientific circles in Australia. Sir Colin Mackenzie has devoted the greater part of his life to an intensive study of the anatomy of the unique fauna of Australia, especially the marsupials. The anatomical structure of these mammalian curiosities presents an unequalled but diminishing opportunity for studying human embryology from the functional standpoint. Work of practical value has already been done on uterine support; the problem of the double uterus; the anatomical relationships of the ureter and genital ducts; the comparative anatomy of the mandible, the central nervous system, the colon, the great omentum, lesser sac, and appendix vermiformis. The marsupials offer an excellent field for the study of postural changes. After a brilliant career as an orthopædic surgeon, Sir Colin retired from practice in 1924 to give the whole of his time to the study of indigenous animals. He founded the Australian Institute of Anatomical Research, which controls a large reservation of native fauna in the mountainous district of Healesville, near Melbourne. His own unique collection of macroscopic and microscopic preparations—for which he recently refused an offer of £100,000—has been presented to the Commonwealth. Since the foundation of the national capital at Canberra, plans have been prepared for an Australian Institute of Anatomy, to be built at a cost of £110,000, on a site of eight acres. Associated with this institute will be a reservation of 80 acres, occupying a peninsula of the Molongolo River, where native fauna can be studied in the natural state. Canberra is destined to become the anatomical centre of the Pacific, and, from the point of view of specimens, the Australian Institute will rank second only to the Hunterian Museum of the Royal College of Surgeons of England. It is fitting that Sir Colin has now been appointed its director.

Medical Education in Victoria.

Prof. R. J. A. Berry, Dean of the Faculty of Medicine at the University of Melbourne, in a report recently submitted to the Premier of Victoria, criticises the conditions of medical education at the Melbourne University. He urges the necessity for the pre-medical general cultural education of students, for a more careful selection of candidates for the

medical course, involving an entrance examination, and he considers that there is grave danger of immaturity under present conditions. Prof. Berry disapproves of the administration of the University Council which he describes as a "non-medical body of elderly men." He objects to their reviewing proposals by authorities on medical education, and he asks for increased powers of spending the money allotted to the faculty of medicine. The Council have responded to his criticism by expressing sympathy with his proposals for reform.

New South Wales Hospital Bill.

The problem of financing the hospitals of New South Wales has been the despair of their managing boards and has over-taxed the resources of the Treasury. In an endeavour to place the hospitals on a sounder basis, a Hospitals Bill has been introduced to the State Parliament. Consideration was given to the proposal to conduct a Government lottery for the benefit of the hospitals (as is already being done in Queensland) but this idea was shelved. The introduction of an amusement tax for hospital purposes was considered impracticable. The imposition of a hospitals tax was not favoured by the State Parliament. In the first place, taxation is already heavy enough, and secondly, there was a fear that nationalisation would dry up voluntary contributions and lead to a more extensive use of the hospitals by those who could afford to pay for private treatment. It is now proposed to divide the State into hospital districts and to constitute a hospitals board consisting of a chairman, two medical men, two representatives of metropolitan and country interests, and a woman member. New South Wales has been fortunate in securing the services of Mr. R. J. Love, until recently the secretary of the Victorian Charities Board, who has just returned from a study of hospitals of Great Britain and America. The board will coördinate the activities of public hospitals with a view to greater efficiency and economy in operation, will allot the subsidies in proportion to the size and needs of the hospitals, and will exercise stricter control over payments by patients who can afford them. Schemes of industrial contributions will be encouraged.

In the discussion which the Bill evoked in Parliament some interesting figures were brought to light. In 1906 there were 20 hospitals in the metropolitan area and 114 in the country. In 1926 that number had grown to 27 in the metropolitan area and 134 in the country. The number of in-patients per year for those years had been 34,800 and 116,636 respectively. The population had increased by 56 per cent., but the number of in-patients had increased by 215 per cent. The advent of motor traffic caused a considerable increase of serious cases; in many hospitals from 10 to 12 per cent. of the patients are there as a result of motor accidents, and they remain in hospital for long periods. More than 60 per cent. of the expenditure at the Sydney Hospital is on account of wages. New South Wales is making an attempt to grapple with a problem which is increasing the world over in magnitude and complexity.

ST. THOMAS'S HOSPITAL.—In his annual report Sir Arthur Stanley, the treasurer, states that, after long and careful consideration, a scheme has been evolved for the erection of an out-patient department on the site opposite the hospital purchased ten years ago. This scheme, he says, "will make St. Thomas's the finest hospital in Europe." He said that the plan which, in its entirety, includes the new medical school, had met with the whole-hearted support of the medical and surgical officers. The accommodation for paying patients in St. Thomas's Home—20 beds for each sex—is inadequate. The medical and surgical staff have represented that 80 or 100 beds would not be too many, and it is hoped that in the near future it may be possible to build such a home on the Paris-street site. Of the 593 beds in the hospital 569 were occupied on the average. There were 11,674 in-patients who stayed 18 days and cost £11 6*s.* 1½*d.* each. There were just under 100,000 new out-patients who cost 12*s.* 6*d.* each. The expenditure was £188,590, which exceeded the income by £3616.

Public Health Services.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

THE following are some 1928 statistics of three county borough health resorts, a borough, and a cathedral city:—

Name of district and estimated (R. G.) population.	Birth-rate.	Death-rates per 1000 of the population.					Death-rates per 1000 births.		
		All causes.	Tuberculosis.	Cancer.	Respiratory diseases with influenza.	Heart disease.	Infant and neonatal mortality.	Young child (1–5 yr.) mortality.	Maternal mortality from childbirth.
Brighton C.B. (148,800)	13·5	12·9	0·91	1·09	1·4	2·7	51/27	39	2·5
Eastbourne C.B. (58,500)	12·4	11·5	0·99	1·74	1·0	2·1	43/30	15	1·4
Hastings C.B. (62,600)	12·0	15·0*	0·93	2·00	2·3	3·2	51/21	23	4·0
Swindon B. (61,110)	15·6	9·9	0·79	1·49	1·2	1·7	36/15	22	4·4
Worcester C. (52,650)	14·8	13·6	1·00	1·78	1·3	2·7	59/28	66	0·0

C.—City. C.B.—County Borough. B.—Borough.
* Standardised rate—10·8.

Brighton.

Dr. Duncan Forbes reports that the borough was extended during the year to include Rottingdean, Ovingdean, a large part of Patcham, and a small part of Falmer. In the added areas many bungalows had been already erected with small regard to either sanitary conveniences or town-planning. The borough council have continued the arrangement made by the county council for the subsidisation of the two nurse-midwives for Rottingdean and Patcham, and with the aid of the residents a new district nursing association has been formed for Moulsecoomb. Dr. Forbes deplores the fact that children die unnecessarily from diphtheria because the family doctor is called in too late and the giving of antitoxin is delayed by waiting for the result of the bacterial examination. He pertinently asks why the examination of swabs in acute cases with exudate in children should not be discontinued. The insurance committee suggests that a rheumatic clinic should be established in Brighton.

There are still bad cases of overcrowding unrelieved. During 1928 the corporation completed 126 houses on the North Moulsecoomb estate and 60 in Whitehawk Valley. All the last-named houses are now occupied by tenants from bad property or from houses which were later occupied by tenants from bad property. The policy of the health committee was to rehouse at Whitehawk tenants from a condemned area, including some which were not desirable, in the hope that given a chance they would improve with healthy surroundings. In 1927 a loan of £4000 was approved for the reconditioning of unsatisfactory houses purchased by the corporation. Up to May, 1929, about £3400 of this amount was spent over the purchase and reconditioning of 23 houses. On Jan. 1st, 1928, the Carlton Hill area was represented covering 3 acres and with a population of 775 adults and 223 children under 10. Brighton's difficulty is that the displaced tenants from the congested areas in the centre, who ought to be housed in the suburbs, cannot pay the increased rents and the bus fares in and out, and many of them are dirty and unsatisfactory tenants. The present scarcity of working-class houses makes a "move-round" difficult. The

housing subcommittee desires to have only good tenants, and in any case the corporation could hardly rehouse bad tenants while there are good tenants living in conditions of overcrowding. The unfit houses cannot be closed and the landlords will not renovate them. Dr. Forbes puts forward as suggested remedies: that the council should consider the relief of overcrowding in sanitary as well as insanitary property in spite of the fact that the tenants cannot pay an economic rent; that a more elastic reconditioning scheme should be introduced; and that private citizens might be encouraged to form a voluntary association for the purchase and reconditioning of poor property.

During 1928 108 samples of milk were examined for tubercle and nine gave a positive result. In three cases cows were found and dealt with under the Order, but in six cases no infective cow was found.

Eastbourne.

Dr. W. G. Willoughby states that 56 subsidised houses were erected during the year, of which 46 were municipal. At the end of the year there were 986 applicants for houses, of whom 81 had a whole house, 127 were newcomers, and 130 lived outside the borough. Of the remaining 648 applicants, 115 had no child, 270 one child only, and 141 had at least three rooms each. Among the remaining 122 and the 270 with one child, there were probably about 200 instances where the council could have good tenants and remove uncomfortable existing conditions. Dr. Willoughby says that it is obviously necessary for the municipality to continue to build houses. At the close of the year only 15 of the huts were still occupied and these 15 tenants were to be provided with houses during the first quarter of 1929. The Municipal Maternity Home (14 beds) admitted 239 mothers for confinement, the total births in the borough being 726. The municipal midwife lives in the Home and attended 103 outside confinements as compared with 86 in the previous year. The antenatal work of the Home is an important development. After four years of comparative freedom from diphtheria there were 120 cases notified in 1928 with five deaths. The average notifications for the previous ten years were about 40.

Eastbourne's sunshine record (1991·8 hours) was the third highest in the United Kingdom (excluding the Channel and Scilly Islands); and the rainfall was 34·73 inches.

Hastings.

Dr. G. R. Bruce states that the chief item of interest among infectious diseases was the increased prevalence of diphtheria during the second half of the year. The peak of the incidence was in the fourth week of July with 21 notifications. The schools were not specially affected and most of the cases occurred in the populous central districts where visitors congregated. Throat swabbing indicated that the germ was widely distributed among contacts. The type of the disease was mild, there being only 2 deaths out of 133 notified cases. The orthopædic clinic at the Royal East Sussex Hospital, fully equipped and up to date in every way, was opened early in the year. At the end of the year there were 55 cases under treatment, 28 sent by the school medical, 19 by the maternity and child welfare, and 8 by the tuberculosis departments respectively. The chain of treatment appears to be complete, says Dr. Bruce, but one weak link is the difficulty in making parents understand the necessity for prolonged treatment and persistence in the exercises at home.

No subsidy houses were erected during the year and there are no municipal houses now in course of erection, although Dr. Bruce points out that there is still an unsatisfied demand for houses from families living in overcrowded rooms, basements, and small unsatisfactory houses, a considerable number of whom could not pay the rent of a council house. The first open-air school in Hastings was opened by Lord Eustace Percy on June 11th on a site previously lent by Miss Rance. The accommodation is for 25 delicate children from 5 to 9 years of age, and the education committee are considering the establishment of another similar school for the St. Leonards end of the borough. The sunshine record of Hastings was 1983 hours.

Swindon.

Dr. Dunstan Brewer reports that the borough was extended on Oct. 1st and that the Hurst municipal housing estate was included. The inhabitants of the area added had always attended the Swindon clinics and used the isolation hospital. The duties of the old Swindon and district hospital board have now been assumed by the town council and on Dec. 1st the borough took over the training school and extern midwifery department, which used to be run by the Wilts Nursing Association. The vast majority of Swindonians are reasonably comfortably housed. There are only four inhabitants per house, and if every unsatisfactory house in Swindon were swept away the population could be housed in the remainder without any overcrowding if the housing were arranged on a completely communistic basis. In practice, however, there is some overcrowding owing to the lack of lodgings for persons with families.

The great feature of the Swindon child welfare system is the continuous clinic at Eastcott Hill, where advice can be obtained every day and at all times. Ninety per cent. of the cases brought are false alarms, but the 10 per cent. represents life-saving. As an example of the value of this work, Dr. Brewer cites intussusception, which so soon becomes desperate. All stillbirths, of which there were 31 among Swindon residents, and all deaths of children under the age of 17, of which there were 66, are made the subject of investigation. This scrutiny of deaths of children has now been carried out for eight years and indicates that the mortality of childhood is now chiefly caused by measles and whooping-cough and their sequelæ. Full details of this investigation are included in the report. Dr. Brewer attributes the decrease in the neonatal deaths to antenatal supervision. The births in Swindon numbered 910, and there were 400 mothers in attendance at the antenatal clinic. In addition to the four deaths of mothers attributed by the Registrar-General to childbirth (making a rate of 4·4), there were two further deaths in connexion with pregnancy, one being from influenzal pneumonia and miscarriage and the other from gangrenous appendix. Most of the cases of ophthalmia neonatorum are treated at the municipal clinics and they are divided by Dr. Brewer into four classes:—

1. Gonococcus ophthalmia of two types, one developing within 72 hours and the other about 10 or 11 days after birth.

2. Blocking of the canaliculus. The discharge, in this case sterile, clears up after a small pellet has been pressed out of the lacrymal sac.

3. Severe ophthalmia due to the pneumococcus and other organisms. This type is indistinguishable from the gonococcal except that the cornea remains intact.

4. The fourth class includes cases associated with various micro-organisms.

Dr. Brewer gives a list of 136 cases of such ophthalmias and the organisms found during the last few years, of which 52 were due to the gonococcus. The report includes an interesting review of the epidemiology of the year. Dr. Brewer inclines to the view that tuberculosis is subject to the same general laws as are other parasitic reactions. He reiterates the view that pneumonia is of more consequence to the public health than any other factor. "If we know accurately what pneumonia is doing, we can tell the health of the community and forecast what is about to happen to it. Pneumonia, when implanted upon other infections or upon chronic disease, is the prime killer of man. From the numbers, but still more from the

types, of pneumonia in Gorse Hill Hospital at any given time the health of Swindon for the immediate future can be determined with surprising accuracy."

Swindon was attacked by small-pox in 1928 having been free from this disease since 1923. In July a Swindon boy returned from South Wales suffering from an acute illness. A few spots developed and his four sisters became ill in turn, but it was not until Sept. 30th that the nature of the disease was recognised. The outbreak was divided into two periods, up to January, 1929, and from March, 1929, onwards. There was a connecting link between the two periods and the report of the whole outbreak is a matter for the next annual report. The workers in Wills' tobacco factory, who were protected by vaccination early in the epidemic, escaped entirely. The day of highest infectivity appeared to be the day before the spots appeared. Scarlet fever, Dr. Brewer points out, is at the present moment the least important of all human infections, but under local circumstances has to be isolated in hospital. An epidemic arose during the middle of the year and the only way of meeting it was to shorten the stay in hospital. About 90 per cent. (numbering 340) of the cases were treated in hospital. There were no deaths and few complications. Very few cases were detained in hospital more than 28 days and many were discharged in a shorter period than this. Nevertheless, the rate for "return" cases was lower than ever before in Swindon.

There were ten deaths from diabetes in 1928. Dr. Brewer thinks this disease is increasing, that it is becoming more a disease of females than of males, and that its incidence in childhood is increasing enormously, at all events, in Swindon.

Worcester.

Dr. Mabyn Read records an extensive outbreak of measles during the first four months of the year. There were more than 1200 elementary school-children attacked, of whom 751 were in the infants' departments. Of the 36 deaths there were two at the age-period 5 to 10, whilst the remainder occurred at the age-period under 5. The high death-rate at the 1 to 5 age-period shown in the above table was largely due to the epidemic, seeing that 27 of the 52 deaths at the 1 to 5 age-period were attributed to measles. There was no death due to childbirth during the year, and during the ten years 1918–27 there were 9002 births registered with a maternal death-rate of 2·11.

There is still urgent need for the building of more houses; 125 cases of gross overcrowding were met with and there were nearly 500 applicants for new houses listed at the end of the year. In two instances, involving 16 houses, the Housing (Rural Workers) Act, 1926, was utilised, the total grants by the local authority amounting to £599 6*s.* 8*d.* During January the Severn was in flood and the water very turbid. The water on the filter beds was frozen and the number of micro-organisms in the filtered water increased, but at no time was there more than one *B. coli* per 100 c.cm. Excepting in January *B. coli* was not found in 100 c.cm. The water in the pure water tank was treated with chlorine from Oct. 13th onwards with excellent results, which continued during February, 1929, when thick ice formed on the filter beds and had to be removed day by day.

Dr. Read records a careful effort to discover the origin of a tuberculous milk which failed. He and the veterinary surgeon took a sample of the mixed milk of 21 cows at a city cowshed, which proved to be tuberculous. The veterinary surgeon again visited the cowshed and took samples from two suspicious cows. Both were reported negative. The intradermal test was applied to all the cows and samples were taken from the six which reacted and again the results were negative. Finally the 21 cows were divided into seven groups and the seven samples so obtained were again certified to be free from tubercle bacilli.

SCHOOL MEDICAL SERVICE.

—	No. on roll.	Aver. E.S. attendance.	Routine inspections.	Special exams. and reinspections.	Percentage defects.
Gloucestershire	Not stated		13,119	7637	12·5
Nottinghamshire	53,164	46,323	16,900	22,480	27·24

E.S. = Elementary school.

Gloucestershire.

THE Gloucestershire Authority has no special schools of its own but some attempt is made to obtain accommodation in institutions belonging to others. All the completely blind and deaf children are now provided for, and Dr. J. Middleton Martin says that the committee is providing in its estimates for the education of one or two cripple children in a special school outside the county. At present there are 421 cripple children still in elementary schools. Treatment is undertaken at hospitals widely separate—for example, at Bath, Bristol, Cheltenham, Gloucester, Stroud, Stratford-on-Avon, and Chepstow. The committee has, however, established out-stations in cottage hospitals, nurses' homes, and special buildings. In 1920 it was thought that 51 out-stations would be needed, but since that date transport facilities have greatly increased so that the number required will probably be smaller. In the next three years 12 new out-stations will be established. Orthopædic cases are at present inspected by the orthopædic surgeon at the Cheltenham Hospital and at seven out-stations, and they are kept under supervision by the surgeon and by the orthopædic nurses who attend the out-stations weekly and also see as many cases as possible in their homes. Efforts are being made to interest the district nurses, who are also the school nurses, in this work, and it is hoped that they will be able to give increasing assistance in the supervision of remedial exercises and the care of appliances. There is a great need for proper education under special medical supervision and the difficulties in the way of providing it should not be insuperable. It is thought that some one person will be willing to help in the training of each cripple. It seems that the nurses who act as health visitors, school and district nurses have many duties to perform. Dr. Martin answers the objection that the district work must make it impossible for them to keep regular appointments at the schools by the statement that they have only defaulted on 15 occasions. The arrangement must improve coördination and prevent monotony, but it demands a staff fully adequate both in quality and in numbers. A sign of the efficient work done by the nurses is the distinct fall in percentage (from 16·3 in 1916 to 7·2 in 1928) of children infected with pediculi in their heads, the improvement being far more noticeable in the rural than in the urban districts. The fall is also much more marked in the older girls than in the entrants, which suggests that public opinion is having much influence in the schools but as yet little in the homes. The dental work in the past has been limited in scope; with an additional dentist and dental nurse considerable extension will be possible. An encouraging feature of progress is the rise in acceptances of dental treatment from 54 per cent. in 1922 to 74 per cent. in 1927–28.

In spite of the pressure of routine medical work it has been found possible to devote a little time to the anthropometric inquiry instituted by the Board of Education. The number of children examined was small, but the results indicate that the Gloucestershire children do not depart significantly from the average in height and weight for the whole country. Separate records kept for the children of the Forest of Dean show that they are slightly shorter than the others, the difference being possibly due to racial characters.

A special inquiry has been made into rheumatic heart disease in coöperation with adjacent counties. The research includes detailed information of the history and environment of the children, but it will be some time before a considered statement can be prepared. Preliminary examination of the records indicates a steady fall from 1921 onwards in the proportion of children affected when beginning school. Dr. Martin's general comment on the progress of school medicine in his area is that "useful as is the work already undertaken there is scope for development in various directions. Thus more centres are required for surgical examinations and intermediate treatment, especially in the southern part of the county, and provision for education simultaneously with treatment for children who cannot attend an elementary school." This is a very modest statement of the needs of the area. It is evident that good use is being made of the facilities and personnel available but that these need considerable extension.

Nottinghamshire.

Owing to the sudden death of Dr. T. E. Holmes, who "saw the School Medical Service grow from its infancy of small beginnings to its coming of age," the duty of presenting the twenty-first annual report has devolved upon Dr. A. C. Tibbits. He notes that two fundamental deficiencies mentioned in last year's report—the failure of many children to obtain spectacles and to accept dental treatment—are being dealt with on the principle of "spending more in order to waste less." Spectacles are now supplied without prepayment on the parent undertaking to repay by instalments, and expenditure is reduced by the fact that measuring for frames is done by the oculists themselves at the time of refraction. The result has been highly satisfactory, 65 per cent. of the children examined for glasses having obtained them this year, compared with 45 per cent. in 1927. Dental treatment is now given without the payment of the shilling fee when this is necessary, and much propaganda, including the display of a film, has been carried on; by these means 48 per cent. of those needing treatment have received it this year, compared with 35 per cent. in 1927. The staff of doctors and of nurses has been increased. Dr. Tibbits specifically mentions the need for accommodation for epileptics. There are no open-air schools in the county, though the number of delicate children suitable for open-air schools is given as 1393.

MENTAL HOSPITAL REPORTS.

Essex and Colchester Mental Hospitals at *Brentwood and Severalls* had, on Dec. 31st, 1928, respectively, 1745 and 1782 patients on their books. The increase at Severalls was chiefly due to transfers from Brentwood. The recovery-rate at Brentwood was 31·78 per cent. and the death-rate 8·85 per cent. Of the 94 men and 132 women discharged during the year, 172 were granted a preliminary period of trial. There was an outbreak of colitis in the spring affecting 44 women, but energetic measures cut short the epidemic, and there was only one death. Otherwise the general health was good. General paralytics are being treated by malaria with some success. A whole-time pathologist has been appointed (to serve the two hospitals), and the equipment of the laboratory is nearing completion. A new nurses' home is being erected, and plans have been prepared for a new laundry and boiler house. The hospital is being wired, and it is hoped that by the end of this year it will be supplied with electricity. During the summer 162 patients enjoyed all-day excursions to Thorpe Bay. During the year the farm and garden gave a good yield. Parole is largely granted; 434 patients are free within the grounds, and 59 outside the estate. A number of the younger female patients are taught hockey under the enthusiastic guidance of the matron, and some of them have shown a distinct aptitude for the game. Sixty-nine attendants and 38 nurses hold their R.M.P.A. certificate.

The recovery-rate at Severalls was 20·3 per cent. and the death-rate 8·1 per cent. An epidemic of typhoid during the summer attacked debilitated patients who were on a mince diet. The outbreak was believed to be due to an infection of the mince, but how this took place could not be shown. Early in the New Year a somewhat unusual outbreak of colitis occurred in one female ward, but there were remarkably few cases of influenza. Organised occupation rooms are now established for handicraft work, and evening classes are held in some of the wards. Regular gymnasium classes are held for both male and female patients, and to them the Medical Superintendent attributes the great diminution in outbreaks of violence and destructiveness. A new wing has been opened at the female hospital villa, and acute cases can now be segregated; a similar wing is badly needed on the male side. An ultra-violet ray treatment room has been equpiped, and a new laboratory is to be built. Plans have been passed for a new wing on the nurses' home and an addition to the workers' villa. Fresh verandahs have been added during the year. Eighty-eight attendants and 30 nurses hold the R.M.P.A. certificate and five nurses have a general hospital training.

Hertfordshire County Mental Hospital at *Hill End, St. Albans*, had 1103 patients in its two blocks at Hill End and Arlesley on Dec. 31st, 1928. The recovery-rate was 30·4 per cent., an increase on the two preceding years. The death-rate was 7·19 per cent., including 11 deaths from tuberculosis and four from general paralysis. There is an urgent need for better accommodation. A number of men have been transferred to the Three Counties Hospital, and most of those remaining are sick, infirm, violent, epileptic, or of troublesome or defective habits. The congestion on the female side was only temporarily relieved by the completion of the new nurses' home. During the year 11 cases of dysentery, two of paratyphoid, and three of diphtheria occurred. Most of the cases were on the female side, where the overcrowding is most acute. General paralytics have been treated with tryparsamide, and suitable cases are, in future, to be inoculated with malaria. A physical drill class for male patients has been taken up with enthusiasm, and classes for raffia work and mat-making have been started in two wards. At the end of last year a canteen was opened, where patients can purchase goods by tallies. This has resulted in an increase in the amount of work done by the patients, especially in the sewing-rooms. One ward on each side is administered on the open-door principle, but only 16 patients are on full parole, and another 30 on parole within the grounds. A good deal of work has been done in the pathological laboratory, which is now well equipped. Two male and two female nurses obtained their R.M.P.A. certificate during the year, but no nurses sat for the State examinations. A mental deficiency institution is to be erected on a site in the Cell Barnes Estate, and plans are being prepared for an additional block at Hill End to accommodate 400 patients.

Cumberland and Westmorland Mental Hospital had 875 patients in residence at the end of last year. There is considerable difference between the day and night accommodation, and on the male side the hospital is overcrowded by day. The recovery-rate was 23·6 per cent. and the death-rate 7·7 per cent. The general health was good, and there was no epidemic except influenza, but the tuberculosis rate was high; 11 patients died of phthisis. All the patients discharged as recovered were allowed a preliminary period of trial. The number on parole is being gradually increased, as is also the privilege of going out for a day with nurses or friends. The chief need of the building is an up-to-date admission block for recoverable cases. Thirteen attendants and seven nurses are certificated or registered. Rather more enthusiasm for study is being shown, but there is still room for improvement.

Monmouthshire Mental Hospital at *Abergavenny* had 1209 patients on its books at the end of last year; this is one of the few mental hospitals in which male

patients outnumber female. The recovery-rate was 21·7 per cent., a figure which is much below the average for this institution, and which is attributable to the unfavourable type of admissions during the year. The death-rate was 5·2 per cent., the same as last year, and the lowest on record here. There was one case of enteric fever, a few cases of colitis, and a few of tuberculosis, but the general health was very good. The visiting surgeon was called in nine times and performed ten operations. The dentist visits weekly. All the patients are encouraged to occupy themselves in some useful way. Parole beyond the estate is given to 36 men and to 80 men and 21 women within the grounds. One ward on either side and the outlying houses and cottages are administered on the open-door principle. The laboratory is quite well equipped, and the visiting commissioners suggest the appointment of a trained laboratory assistant. They comment on the fact that there is no provision for ultra-violet ray treatment, or for cinema entertainment, and express doubt about the milk-supply. During the year 12 nurses passed their final examination.

Carmarthen, Cardigan and Pembroke Joint Counties Mental Hospital at *Carmarthen* had 651 patients on March 31st, 1929, an excess of 67 on the estimated bed space. The recovery-rate was 31·66 per cent. and the death-rate 9·14 per cent. The general health was not very satisfactory. There were 34 cases of influenza, 12 of diarrhœa, eight of tuberculosis, five of bacillary dysentery, and three of typhoid. The dentist attended weekly and treated 156 patients. The hospital is still without electric current, but the new drainage scheme and water-supply has been completed, and a new hot and cold water-supply is nearly finished. Other sanitary improvements at the farm have been effected. The dietary has been improved; butter is given in preference to margarine, but condensed milk is still used in tea and coffee. The visiting commissioner suggests the appointment of a laboratory assistant in order to bring the laboratory into activity. Great interest is taken in wireless, but more could be done to increase the patients' interest if the hospital had a cinematograph and a large motor conveyance. The farm accounts showed a loss of £117, but the profit on the garden was £218. Nine out of 11 candidates were successful in the preliminary examination for the R.M.P.A.

Glamorgan County Mental Hospital at *Bridgend* had 2032 patients on the registers at the end of 1928, an increase of 99 on the previous year, which has caused overcrowding. Fewer cases of general paralysis were admitted, but there were more chronic and congenital cases, and the prognosis was unfavourable in 65 per cent. The recovery-rate therefore dropped from 31·1 to 21·1 per cent. The death-rate of 7·8 per cent. is the lowest since 1879. Cause of death was verified by autopsy in 61·3 per cent. of cases. General health was good, except for 71 cases of influenza and three of dysentery. The visiting surgeon performed three operations and the visiting dentist 914 extractions. Although a room is set aside as a laboratory both at Angelton and at Parc Gwyllt, the commissioners do not consider that either of these rooms comply with the essentials of a laboratory. They stress the urgency of putting the laboratory in order and of appointing a laboratory assistant. Butter has been substituted for margarine, and tinned meat is now only used in emergency, but the commissioners think that more fruit and salads might be given. Cinema entertainments are held at both branches. Ten attendants and 15 nurses obtained their certificates; 57 per cent. of the men and 25 per cent. of the women are now certificated.

The Report of *Down County Mental Hospital, Downpatrick*, is illustrated by a number of photographs of the institution. There were 766 patients on the books on Dec. 31st, 1928. The recovery-rate was 36·9 per cent., a reduction on the previous year due to the very unfavourable character of the admissions. The death rate was 5.9 per cent., and autopsies were held on 21 of the 45 cases. The hospital is without electric current, which deprives the patients of several modern methods of treatment and enetrtainment. Over 100 men go outside the grounds daily, and 76 women are taken out once a week. The farm returned a profit as well as providing valuable occupation for the patients. There is no occupational therapy, but the Medical Superintendent records the impression made on him by a visit to the Dutch mental hospitals, where he found practically every patient employed. Fifty members of the staff hold the R.M.P.A. certificate, 12 having passed their final examinations during 1928. The medical staff are assisted by a visiting dentist and consultant physician, surgeon, and ophthalmologist.

Mental Defectives.

The Report of *Royal Eastern Counties Institution for the Mentally Defective* at *Colchester* is, as usual, abundantly illustrated by photographs of happy inmates at work and play. The Medical Superintendent makes the need for research the key-note of his report, and remarks how little foundation of proved fact there is on which to build theories of mental deficiency. The Littleton House School for mentally defective boys at Cambridge is to be attached to the Colchester Institution as a school branch. It is hoped that this will increase facilities for research. The Colchester Institution is to pay a rent to the trustees of the school, and the whole of the income accruing to the Trust is to be devoted to research. The particular type of research to be followed at any time is to be decided by a board of governors appointed by such bodies as the University of Cambridge, the Medical Research Council, the Board of Control, and the Board of Education. The very enlightened terms of this Trust are largely due to the owner of the property in which Littleton House is situated—Miss Ruth Darwin of the Board of Control.

Commenting on the advantage of sending out patients on licence, the Medical Superintendent quotes two cases of severe illness among girls living with foster-parents. Had they not been on licence, it would have been impossible to act with the promptitude necessary to save their lives. During 1928, 50 cases went out for the first time or on further trial, bringing the total to 118. Of these, two died and 23 had to return to the institution; 22 were working for wages in the care of friends, 14 were in living-in service, and 32 working at home or with foster-parents. Girls in service always spend their holidays at the seaside branch of the institution. While the year's work has been excellent, and several improvements have been made to the building, the report ends as usual in an urgent appeal for more funds to carry out necessary extensions. Applications for admission have to be refused almost daily. Two semi-detached houses and two cottages have been bought for the use of the staff, but the building of new villas has not yet been commenced. A new farm is to be added, and a house has been chosen at Witham, which, although it can only be a sub-branch, will at least accommodate 33 more adult patients. Bridge Home at Witham now houses 257 patients of the lowest grade. An idea of the work here is given by the statement of the Medical Superintendent that during the year the staff had to deal with 4749 wet beds, 1157 dirty beds, 1922 boys dirty in the day-time, and 2546 epileptic fits. The number of fits has been greatly reduced during the last few years by the use of luminal. The various shops all did excellent work and made good profit. The brush shop made 9123 brooms and brushes, and the shoe-shop made 300 pairs of new boots, as well as doing all the repairs for the branch—over 30,000 pairs. The School Guides and Brownies have now taken 300 second-class and proficiency badges, and although there is no complusion every girl in the school belongs to the company or pack. The frontispiece of the report is a photograph of part of the company, which appeared—to everybody's immense delight—on the outside cover of "The Guide," the official organ of the Girl Guides Association. The scouts have already won 23 badges, and the team came out fourth on the

list for the Ambulance Shield. Attempts are being made to get more boys working in the garden, as those who go out will probably have to earn their living on the land, and the Medical Superintendent feels that a boy can be kept too long doing simple handicrafts which he has completely mastered. The institution has now begun to act as a day school as it was obviously uneconomical for the local authority to open a day-centre with the Royal Eastern Counties Institution so near. There is very little illness among the children. One cold February day there were 20 patients in bed out of 1100 in residence. Nursing a mental defective, therefore, is chiefly a matter of being able to teach a child to keep clean and happily occupied, and the Medical Superintendent welcomes the extension of the R.M.P.A. examination to include proficiency in any one of four main sections of the work of a big modern institution. The death-rate was 1·74 per cent., which includes two deaths of patients who had been on leave of absence for a year or more. The tuberculosis death-rate was 0·58 per cent., a remarkable drop from 4·6 per cent., which was the average figure from 1859 to 1904. Since a general Schick test in 1925, and the immunisation of all susceptibles, there have been no cases of diphtheria.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED AUGUST 31ST, 1929.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 131 (last week 139); scarlet fever, 1833; diphtheria, 850; enteric fever, 84; pneumonia, 522; puerperal fever, 64; puerperal pyrexia, 114; cerebro-spinal fever, 16; acute poliomyelitis, 24; encephalitis lethargica, 20; continued fever, 1; dysentery, 5; ophthalmia neonatorum, 128. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the Metropolitan Asylums Board on Sept. 3rd–4th was as follows:—Small-pox, 165 under treatment, 8 under observation (last week 144 and 24 respectively); scarlet fever, 1335; diphtheria, 1405; enteric fever, 18; measles, 311; whooping-cough, 220; puerperal fever, 23 (plus 8 babies); encephalitis lethargica, 124; poliomyelitis, 1; "other diseases," 18. At St. Margaret's Hospital there were 13 babies (plus 5 mothers) with ophthalmia neonatorum.

Deaths.—In the aggregate of great towns, including London, there was no death from small-pox, 2 (0) from enteric fever, 20 (0) from measles, 6 (2) from scarlet fever, 22 (4) from whooping-cough, 19 (4) from diphtheria, 78 (10) from diarrhœa and enteritis under two years, and 18 (2) from influenza. The figures in parentheses are those for London itself.

Of the deaths from diarrhœa (the fewness of which is gratifying) 8 were reported from Liverpool, 6 each from Birmingham and Hull, 5 from Sunderland, 3 each from Portsmouth, Southend-on-Sea, Leeds, and Gateshead. The deaths from enteric fever occurred at Southport and Cardiff.

The number of stillbirths notified during the week was 267, corresponding to a rate of 40 per 1000 total births, including 46 in London.

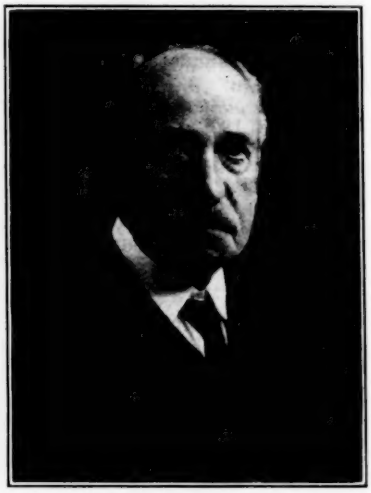
THE LONDON HOSPITAL.—The House Committee reports that last year the in-patients numbered 14,049 and stayed on the average 17·67 days. The out-patients numbered 70,962 and a further 25,966 persons suffering from minor ailments were dealt with in the receiving room. The income was £316,000 and the expenditure £276,000. In-patients cost £5 13*s.* 5*d.* each and out-patients 15*s.* 6*d.* The report for the quarter ending August 31st states that the radium department is now in working order. The radium is kept in a safe in a strong room, encased in 7¼ tons of lead. The gramme of radium which has been delivered is being used for the making of radon, but as more can be made than is actually required arrangements have been made for supplying it, at a charge, to other hospitals and to members of the staff for private cases. A second gramme will be delivered shortly in the form of needles.

Obituary.

SIR SEYMOUR SHARKEY, D.M. OXF., F.R.C.P. LOND.

THE death of Seymour John Sharkey at his home in London removes almost the last of a band of men to whom the school of St. Thomas's is indebted for its re-establishment in the honourable position it held prior to the temporary eclipse occasioned by its migration from Southwark to Lambeth.

Seymour, one of the three talented sons of Dr. E. P. Sharkey, an Irish medical man, was born in 1847. Educated at Christ's Hospital, he gained a classical scholarship at Jesus College, Oxford, of which College he was elected an honorary Fellow in later life. His inclinations passed at an early period from classical study to that of science, and he gained a first class in the honour school of natural science. He thus came under the influence of one of the masters of modern biological research, Prof. G. Rolleston, F.R.S. Sharkey became one of Rolleston's demonstrators, and this association without doubt remained a lasting influence both on his line of thought and his conception of what the life of a physician should be. His Oxford career ended with his election to a Radcliffe Travelling Fellowship in 1873, and his medical life commenced with experience gained in continental universities, particularly in Germany, followed by entrance at the school of St. Thomas's Hospital. After qualification in 1875 he became resident assistant physician to the hospital. At the termination of his period of office he was much shaken by the death, attributed to overwork, of one of his brothers, so much so that it was thought advisable by his friends that he should seek an absolute change of occupation and surroundings. Hence he spent some time travelling abroad, returning later to be elected assistant physician to the hospital. This episode is worthy of mention because it explains the rigid rule, maintained for the rest of his life, not to allow any consideration to compel him to see more than a certain number of patients daily or to interfere with his week-end relaxation.



SIR SEYMOUR SHARKEY.

Photo by Elliott & Fry.

Once elected on to the staff of his hospital Sharkey's energies were devoted largely to the work of the institution and to the furtherance of medical education. His teaching was well informed, sound, and effective, and many generations of students retain grateful memories of the help they received from him. He was certainly for a long period the most popular teacher in the school. The work of the hospital was performed with energy and precision. Visits were never missed, never commenced late, or terminated too early, and Sharkey gave confidence to the patients, to the

juniors, and to the nursing staff; by all he was respected and indeed beloved. His interests were with medicine in general, but in his early days he acquired a reputation for special knowledge as a neurologist as a result of clinical observations connecting localised disease of the brain with definite symptoms and signs, and this work justified his later election as President of the Neurological Society. Admitted a Member of the Royal College of Physicians in 1879 he became a Fellow in 1885, and in the following year delivered the Goulstonian lectures, on Spasm in Chronic Nerve Disease, which were published in THE LANCET. His subsequent association with the Royal College of Physicians was intimate, for he acted as examiner and served the College as Censor for some years, becoming Senior Censor in 1912. In 1906 he delivered the Bradshaw lecture on "Rectal Alimentation" (THE LANCET, 1906, ii., 1263). He was knighted in 1914, but declined a second honour offered him for his services when he retired from office as medical referee to the Treasury.

Sharkey was above all things an enthusiast in clinical medicine. More than any other part of his work he loved teaching, and his pupils of all degrees, and over many generations, recognised and appreciated his efforts, though they sometimes smarted under his incisive tongue. He will be remembered with gratitude and affection in many parts of the world by a wide circle of those who profited by his teaching or were inspired by his example. Sir George Makins, for whose recollections of Sharkey's earlier career we are indebted, sends us the following personal note.

Sharkey's choice of St. Thomas's as his school was determined by the reputation of Charles Murchison as a clinical teacher, and his own method was no doubt founded on the lines adopted by Murchison. St. Thomas's, however, at that period was fortunate in the possession of a gifted clinical teacher of a more philosophic turn of mind, John Syer Bristowe, and it is probable that a just comparison between the methods of the two men preserved Sharkey from the superlative dogmatism which dominated Murchison's teaching. Murchison's method was perhaps ideal for candidates preparing for examination, Bristowe's for enlarging the man's horizon and creating a proper scepticism regarding certain received beliefs. With Murchison an answer was either right or wrong; Sharkey, while adopting Murchison's precision, was always open to argue the point, and in such discussions he delighted. His pupils had a certain fear of his sarcasm and were not always convinced by his reasoning. A characteristic example of his sense of fairness and right in the management of his school was exhibited shortly after his appointment to the assistant staff. At that time the entire sum derived from the fees of the students after the expenses of administration had been deducted was divided amongst the members of the senior staff. Sharkey and his immediate surgical colleague, Clutton, attacked this arrangement with great vigour, and it is of interest to recall that they only carried the day when on election to the senior staff they acquired sufficient influence to bring about a change by which they suffered personal loss.

No sketch of Sharkey would be complete without mention of two friends who materially influenced his habits and career. His association with H. H. Clutton commenced with their respective appointments as senior residents at St. Thomas's and persisted until Clutton's premature death. Until Clutton's marriage they lived together. There was little resemblance between the two men; Sharkey was of a philosophical turn of mind, Clutton eminently and severely practical, and this diversity perhaps explained the permanence of the association. The two men never wearied of discussing and arguing on any subject which interested them. Sharkey was one of the early physicians to welcome the aid of surgery, and a bedside consultation between the two men was a source of real pleasure to their respective classes. When a difference of opinion arose the two chiefs would attack each other with freedom and familiarity, and doubts as to who would be the winner enlivened the audience. His other most intimate friend was Sir George Savage, who was the companion of his hours of relaxation. They fished, played golf, and gardened together. Sharkey was an expert dry-fly fisher and could bring home trout when no one else could find or lure them.

Sharkey maintained a semblance of unchanging age until some six months before his death. He was never married, but he delighted to entertain in his charming home. It was as a host and also at the meetings of a small dining club, of which he remained a member to the end of his life, that his social talents showed to best advantage. In his last years he was to be found on most afternoons in the smoking room of the Athenæum reading and chatting with his friends. Sharkey's strict sense of honour, absence of any shadow of self-seeking, and conscientious fulfilment of the duties he undertook brought him many friends and gained for him the respect of all those with whom he was associated.

Dr. T. Dyke Acland writes: I first knew Sharkey when he was an undergraduate at Oxford. He was then, as he remained all his life, full of fun, active, energetic, and enthusiastic. He carried his vitality into his work as well as into his play. Wherever he was he gained for himself the affection and confidence of his teachers, friends, and fellow students. At Oxford he came under the influence of Sir Henry Acland, Sir J. Burdon Sanderson, and Prof. Rolleston, and remained on terms of intimate friendship with them all until their deaths. It was under the direction of the Regius professor that he commenced the practical work in a clinical laboratory which he later developed so successfully at St. Thomas's Hospital. Throughout his career Sharkey was always ready to help and advise those who were in difficulty, and though some found his manner brusque and his criticisms outspoken, he was recognised to be a wise counsellor whose opinions should not be lightly disregarded. Sharkey had a strong and vigorous personality. He spent his life doing that which he believed to be right, and spoke the truth from his heart.

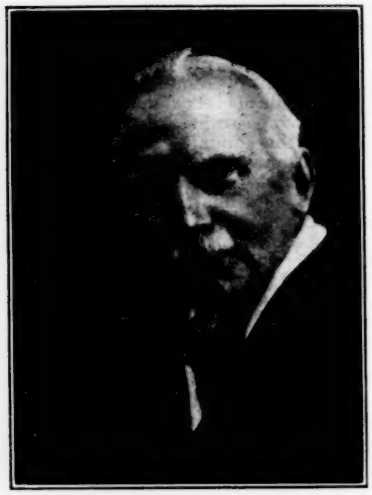
FREDERICK FOORD CAIGER, M.D., F.R.C.P. LOND., D.P.H.

Dr. Foord Caiger died rather suddenly on Sept. 5th while on holiday in Scotland, and his death will leave a blank in the lives of a large circle of friends and colleagues who had found in him a wise clinician, an able administrator, and a loyal friend.

Frederick Foord Caiger was born in December, 1860, the son of Frederick Henry Caiger, F.R.I.B.A., architect to the Metropolitan and City Police. He was educated at Westminster School and St. Thomas's Hospital, where he was Mead medallist, and from which he qualified in medicine at London University in 1883, being awarded the gold medal in surgery and honours in other subjects. Three years later he took the M.D. Lond., and shortly after the D.P.H. Cambridge. He held three house appointments at St. Thomas's Hospital, and five years after qualifying entered the service of the Metropolitan Asylums Board as assistant medical officer at the Northern Fever Hospital, where his work was such as to lead to his appointment as medical superintendent of the South-Western Hospital, Stockwell, before he was 30 years old. This office he held continuously until October, 1926, when he retired from the service of the Board after an association of 39 years. For the last five years of this period he was chief medical officer of the whole infectious hospital service, and was called upon to guide the policy of the Board in such matters as the best allocation of beds among the various kinds of infectious fevers, the employment of the new immunity tests, and the early administration of antitoxin in diphtheria.

In 1921 Caiger was appointed emeritus physician to St. Thomas's Hospital. As a clinician and a teacher he then had a reputation, both within his own hospital and outside, which was second to none. He was

clinical teacher in fevers to the R.A.M.C., and it was a tradition with St. Thomas's students that their fever course should be taken with him at the South-Western Hospital, where, unless application were made at the earliest possible moment, there was but little chance of getting on the list. His lectures were lucid and stimulating, and his clinical demonstrations first-rate. Caiger was always abreast of his subject, and readily adopted any innovation of value, be it for diagnosis, treatment, or prevention. But he never lost the sense of perspective, and we have many testimonies to the excellence of his advice and the soundness of his diagnosis. Although he never published a text-book on fevers, Caiger was much in request as a writer on his subject, and his contributions to Allchin's Manual, Quain's Dictionary, and Allbutt's System are well known. He was always ready to accede to the requests of local medical societies and of the Medical and Physical Society at St. Thomas's for an address on some topic of interest connected with his specialty. His interest did not lie only with the clinical side of medicine; like all good clinicians he recognised pathology as the basis of sound clinical advance, and it was on his advice that the Board in 1925 appointed a Director of Research and Pathological Services, and decided to establish two thoroughly equipped group laboratories. Caiger was the first chairman of the Scientific Advisory Committee set up by the Board, after consultation with the Medical Research Council, to advise on the extension of knowledge by research and the full and prompt application of available knowledge to fever practice. He was a member of the Antityphoid Inoculation Committee appointed by the Army Council in 1904 and played a large part in the long and difficult investigations involved in the preparation of their report. In his Bradshaw lecture, delivered the same year before the Royal College of Physicians of London, he gave a masterly survey of the treatment of enteric fever as then practised, registering his conclusion that any further advance in treatment must be sought in biological sources.



DR. FOORD CAIGER.

Photo by Elliott & Fry.

Caiger possessed in high degree the qualities required for successful administration and organisation, and these stood him in good stead when he was commissioned to open the Fountain Hospital during an exceptional incidence of scarlet fever in 1893, and six years later when 500 beds were provided at the Grove Fever Hospital to meet an unusually high seasonal rise of enteric fever. He took a personal interest in the welfare of the hospital staff generally and individually, and succeeded in gaining their loyalty and devotion and in no small degree their affection. It was largely owing to him that the Fever Nurses Association was founded. He was its hon. treasurer from the start and at one time its president. Caiger's relations with his fellow practitioners in his neighbourhood were cordial and intimate. At St. Thomas's it was to him that application was made for assistance in the thorny problems of accidental infections, and many a resident had reason to be thankful for his ready help and solicitous treatment. Local practitioners found him sympathetic with their difficulties and tactful with their mistakes. "We all learned," one of them writes, "to come to him, knowing full well that he at least would never make us feel that we had been grossly stupid or unobservant." "Among Caiger's charms," another writes, "was a natural and sympathetic consideration for everyone with whom he worked. The only way to make him bristle aggressively was to suggest some adverse criticism of his staff or of the Board to which he was loyalty itself. Any lack of consideration to a subordinate would promptly arouse his condemnation; at the same time he was magnanimous in his praise of any effort to do the right thing."

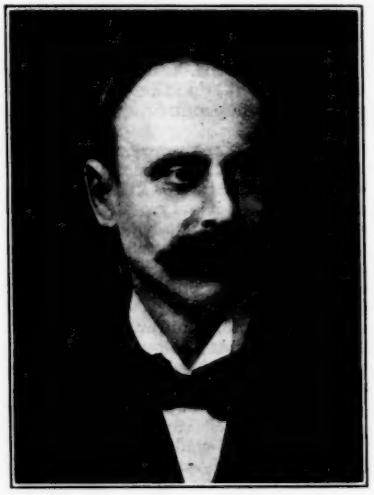
On his retirement from the Metropolitan Asylums Board three years ago, Caiger's help remained available to private practitioners in their clinical problems. He remained active on the Governing Body and Executive Committee of the Enham Village Centre for the curative treatment and training of disabled ex-Service men, to the organisation of which he had given much time and thought. Of his personal characteristics little more need be said than what has appeared in connexion with his professional work. His tastes were simple and he had a deep appreciation of natural beauties which made his companionship on foreign travel pleasant and stimulating. He was a good impromptu speaker, with just the right touch of hesitation in choosing the appropriate phrase or illustration which always came. He lived, as one of his friends puts it, every moment of his life to its fullest and best.

Dr. Caiger married in 1895 Madeline, daughter of Alexander Orr, a landed proprietor in Australia, who survives him. Their only son was killed on the Western front in November, 1916.

SIR JOHN CAMPBELL, M.D., M.CH., LL.D. R.U.I., F.R.C.S. ENG.

Sir John Campbell, who died on August 31st at his home in Craigavad, Belfast, was born in 1862, being a son of the Rev. Robert Campbell, of Templepatrick, Co. Antrim. He was educated at the Royal Belfast Academical Institution and at the Royal University of Ireland, and also studied in London and abroad. He took a degree in biology with first-class honours in 1883 before turning to medicine, when he gained a scholarship in therapeutics and pharmacology and the Coulter exhibition at the Belfast Royal Hospital. John Campbell qualified and proceeded to acquire the higher degrees in medicine and surgery in quick succession, becoming F.R.C.S. Eng. in 1891. He served as demonstrator of anatomy under the late Prof. Peter Redfern for five years, and for a time held the post of assistant surgeon to the Belfast Hospital for Sick Children. Later he took up gynæcology and obstetrics, and became consulting surgeon to the Maternity Hospital for Women. His name is chiefly associated with the Samaritan Hospital for Women, to which institution he was attached as surgeon, and later as senior surgeon for many years. He worked hard not only to establish the prestige of this hospital but to raise that of his specialty throughout Ireland, and succeeded well in this task. His publications included successful text-books as well as original articles. In 1909 John Campbell's services to medicine were recognised by the honorary degree of LL.D. of the Royal University of Ireland. When the Northern Parliament was formed in 1921, he was elected as one of the four Unionist Members for Queen's University, and he sat in the House until Parliament was dissolved this year. At the time of his death he was Chairman of Convocation. During the war John Campbell acted for a time as surgeon to No. 5 British Red Cross Hospital at Wimereux. He was knighted in 1925.

Prof. Andrew Fullerton writes: "The passing of John Campbell removes an outstanding figure from the community of Northern Ireland, where he has occupied a prominent position for a period of nearly 40 years. A man of great ability, wide culture, and transparent honesty, he commanded the admiration and respect of a large circle not only in his own country but far afield. His industry at the Samaritan Hospital and in practice, regardless of financial return, brought its reward, and in a few years he gained a reputation for ability, skill, and judgment which most men take long to attain. His success as a surgeon did not spoil him, and he remained the same modest, unassuming rock of common sense who had impressed his fellow students in his undergraduate days. Few medical men of his time have not at some period of their lives confided their troubles to him, and sought and obtained his sage advice. In the Parliament of Northern Ireland he proved himself a wise counsellor whose opinions carried weight with politicians of all sides.



SIR JOHN CAMPBELL.

"To the public, he was a man of few words, downright in his manner of expressing himself, and to all appearance stern and reserved. To the inner circle, however, he was a most charming companion. His education had been conducted on liberal lines and he had a mind well stored with information, but his strong sense of humour saved him from imparting more than would interest or entertain his listeners. A superficial observer might have thought him unsympathetic, but those of us who were intimate with him knew that he had a kind and sympathetic heart. He was greatly affected by his war experience. I remember when he first came to France, meeting him at the boat and taking him to visit some of the hospitals, to show him the kind of work he would be expected to do. At the end of the first days he felt the strain badly, but he carried on and did good work. His colleagues at No. 5 British Red Cross Hospital will hear with great regret of his death and will think of him with the kindest memories and with warm appreciation of his services."

PERCY CHARLES WOOLLATT, F.R.C.S. EDIN., M.D. BRUX.

Mr. Percy Woollatt, who died recently as the result of a motor accident in Normandy, was younger son of the late Mr. S. P. Woollatt, J.P. for Hertfordshire. He took the conjoint qualification from the London Hospital in 1905, later adding the M.D. Brux. and the F.R.C.S. Edin., and entering the Indian Medical Service was stationed at Shiraz, where he had charge of the Indian Government Hospital, and was medical officer to the telegraph department. Later he was surgeon to the Imperial Hospital at Teheran, and his surgical skill became notorious throughout Persia, securing him a freedom of movement in a dangerous country which was denied to many of his colleagues. On the outbreak of war in 1914 he volunteered for service in the navy and was appointed to the Haslar Hospital. On his return to South Persia it was as surgical specialist to the Forces there until 1920, when he retired from foreign service and took up general practice at Hinckley, Leicestershire, with charge of the Cottage Hospital. Lately he was consulting surgeon in London. His elder son is a medical student.

DR. WALTER ERICHSEN (ERIC) POWELL, who died on August 31st, as the result of appendicitis, was in his 35th year. He was educated at Brighton College and Charing Cross Hospital, qualifying M.R.C.S. in 1917. He then joined the navy and was appointed to a "Q" boat in which he saw service in the Mediterranean. When the Armistice was declared he returned home to join his father, Dr. W. A. Powell, in practice at Brighton. He was anæsthetist at the Brighton Poor-law Infirmary, and deputy anæsthetist at the Throat and Ear Hospital. He also acted as deputy police surgeon. He leaves a widow, who was formerly a sister at Charing Cross Hospital, and six children.

Correspondence.

"Audi alteram partem."

ON RESTARTING THE HEART-BEAT.

To the Editor of THE LANCET.

SIR,—Experiments I carried out on cats six or seven years ago showed that the heart could be restarted (and could thereafter raise the blood pressure to 100 mm. Hg) even so long as an hour and sometimes two hours after it had ceased to beat (B.P. = 0). The method employed was intracardiac injection of adrenalin along with either artificial respiration or instillation of oxygen into an artery—generally the femoral, using the profunda femoris as a cannula. Spontaneous breathing was never resumed if the B.P. had been nil for over 15 minutes. If the heart had completely ceased beating for only 5–10 minutes, then natural respiration might reappear, but the cat (though it sometimes lived for 24 hours) was never normal, and in behaviour closely resembled a decerebrate animal.

From all my observations I concluded that if the circulation had entirely ceased (B.P. = 0) for five minutes, the cerebrum never revived. After ten minutes the central nervous system was dead down to the pons, after 15 minutes down to the calamus scriptorius. It seems therefore hopeless to look for complete recovery of all the faculties in man if the circulation has entirely ceased for even five minutes, and restarting the heart and continuing artificial respiration if the heart has ceased to beat for so long, as 15 minutes is a useless waste of energy. In cases in which complete recovery has been reported at later periods, probably the circulation had not, in fact, entirely ceased.

The lesson to be learned from these facts is that cardiac massage, adrenalin injection, and artificial respiration must be applied at the earliest possible moment if valuable results are to be attained, and that they should be resorted to in all cases where the heart seems to be stopping before actual cessation has occurred.—I am, Sir, yours faithfully,

THOMAS LUMSDEN.

Lister Institute of Preventive Medicine, London, S.W., Sept. 7th, 1929.

CEREBRAL LOCALISATION.

To the Editor of THE LANCET.

SIR,—In a short notice in the last issue of THE LANCET of a book by Dr. R. Brugia, the reviewer seems to treat the ideas put forward by the author

as something new, and asks pertinently: what is meant by "centre" and what by "localisation"? On the clinical side Marie, working at the same hospital as Broca but with a more extensive choice of subjects, proved that Broca's theory of localisation was untenable. His positions are set forth in the work of Dr. F. Moutier, "L'Aphasie de Broca." Prof. von Monakow in his "Über Lokalisation der Hirnfunktionen" arrived at conclusions concordant with those of Marie. Since then many authors, notably a school of Italian physicians, have further subjected Broca's theories to a destructive criticism.

In 1912 I published my "Psychology: A New System," in which on purely psychological grounds—borrowing from physiology only the hypothesis that the development of the brain has been "economic"—I made it clear that it could not be stated categorically that Broca's theory was right or wrong, for the whole conception that underlay his localisation was faulty. The demonstration that I offered found confirmation in Marie's observations, but it should be looked upon rather as giving the necessary underlying explanation of the results at which that great neurologist had arrived. The methods I employed were the developments of the elaborate analysis on which I based the entire system of my psychology; but an indication may be given which will show that Broca's theory of aphasia is inconsistent even with that of the "centres" involved. The analysis of any word, when its meaning is fully comprehended, would imply the activities of a series of "centres" corresponding to visual, aural, tactile, and muscular sensations, and this fact in turn implies connecting nerve paths sufficient to supply the necessary associations. Thus we find that remote though associated parts of the brain are in activity during each movement, however simple, of consecutive ideas, and this activity is not merely that of primary excitation but also of corresponding inhibitions. As Sir William Gowers remarked, the brain is not like a piano, but rather like an organ; I would say, it is more like an elaborate system of charged telegraph wires.

Now, to represent the matter strikingly, I submit that when our histology has been perfected and our physiological psychology further advanced, then, with delicate instruments, it would be possible, without touching the third left frontal convolution, to produce not only Broca's aphasia but a veritable assortment of aphasias. The proper image to be formed is not that of "centres," but of a complete system of interrelated activities. What has been called a centre is not a terminal station, but, to use von Monakow's expression, a gate.

I am, Sir, yours faithfully,

ARTHUR LYNCH.

Haverstock Hill, N.W., Sept. 6th, 1929.

EFFECT OF X RAYS ON BLOOD PLATELETS.

To the Editor of THE LANCET.

SIR,—In a paper by Dr. Samson Wright and Dr. H. A. Bulman, published in your issue of August 3rd (p. 217), on the Selective Action of X Rays on the Blood Cells of the Cat, some observations on the effect of irradiation with X rays on the blood platelets show a substantial agreement with similar observations on the effect of gamma rays from radium, published by us in 1922.[1] Instead of drawing attention to this agreement Dr. Samson Wright and Dr. Bulman give an incorrect account of our results and conclusions and state that their results are contrary to our experience In view of the importance of the subject and of the promise of a more detailed publication by them it may therefore be well to restate briefly our results.

We found in experiments on rats that exposure to gamma rays produces a thrombopenia. If the doses were moderate—i.e., sublethal—the number of platelets shows a rapid spontaneous recovery to the normal. Dr. Wright and Dr. Bulman found the same after exposure to X rays. If the dosage of gamma radiation was increased we found that the number of platelets did not rise again, an anæmia developed, and the animals died. In our experiments the animals died in the third week—later than in the experiments of Dr. Wright and Dr. Bulman. At death our animals exhibited signs of a general infection. Our experimental observations agree with the clinical observations that cases of pernicious anæmia have occurred among radium workers. In these human cases there has also been evidence of a general infection. Between the observations on rats with radium and on cats with X rays there is, therefore, complete agreement on the main point that large doses of irradiation produce a diminution in the number of platelets.

An apparent discrepancy is presented by the platelet counts of two cats in Dr. Wright and Dr. Bulman's series which died or were killed on the seventh and tenth day respectively. Both these animals were heavily infected but the platelet count was stated to be "normal." It was 1·5 millions in one animal, 0·75 million in the other. Dr. Wright and Dr. Bulman comment on these findings by saying that they are "contrary to the experience of Cramer, Drew, and Mottram with the rat, who found a marked decrease in the platelet count following gamma radiation in animals that died of intercurrent infections." On this point we wish to remark, first of all, that we did not make the statement in this form. We found a decrease in platelets following gamma radiation whether the animals died of intercurrent infections or whether they survived. Secondly, our animals died after a much longer period after exposure (17–20 days) than the cats of Dr. Wright and Dr. Bulman (7 and 10 days). Since in their surviving animals the onset of the thrombopenia did not begin until the twelfth day, the two cats with a count stated to be normal died before the thrombopenia had time to develop. Lastly, the authors state that the platelet count of normal cats in their series varied from 0·75 million to 5 millions. No such wide variations are found either in normal rats or in man. If this statement is correct it would suggest that cats are not the most suitable animals for the study of variations in the number of blood platelets.

We are, Sir, yours faithfully,

W. CRAMER,
J. C. MOTTRAM.

Imperial Cancer Research Fund, Radium Institute, Sept. 6th, 1929.

[1] Proc. Roy. Soc., 1922, xciii., 449.

DISINFECTANT PACKETS.

To the Editor of THE LANCET.

SIR,—Dr. Earp's letter in your issue of Sept. 7th (p. 530) has drawn my attention to a quotation in the report of my remarks at the Fourth Imperial Social Hygiene Congress (THE LANCET, 1929, ii., 140) which may give rise to a misunderstanding. In quoting the statistics mentioned I applied the expression "for what it is worth" to my remembrance of the figures, mentioning that I was speaking from memory, and promising to bring the original documents to the next session in order that those interested might verify the figures. Unfortunately, your necessarily abbreviated report of the proceedings has made it appear that I applied the expression "for what it is worth" to Prof. Queyrat's figures—which was far from my intention. These figures and others bearing on the same question, to which I would refer Dr. Earp, can be seen in *Mouvement Sanitaire* (1927, iii., 607–15), and in Prof. Queyrat's address before the Assembly of the Union Internationale contre le Peril Venerien, Nancy, 1928. (Texte des Rapports, p. 50.)

I am, Sir, yours faithfully,

S. NEVILLE ROLFE,
Secretary-General.

Carteret House, Carteret-street, London, S.W., Sept. 9th, 1929.

COUNTY MEDICAL OFFICERS OF HEALTH IN IRELAND.

THE Department of Local Government and Public Health of the Irish Free State is pressing for the appointment of county medical officers of health, and it is understood that four or five appointments will shortly be made. Our local correspondent informs us that several counties are still reluctant to take action. For example, the South Tipperary County Council and Board of Health have passed resolutions protesting against the proposed appointment of a county medical officer as expensive and unnecessary, having regard to the existing dispensary doctors. The Leitrim County Council has adjourned the consideration of the question on the grounds that the appointment is unnecessary. One member of this council expressed the opinion that there was no sense or reason in appointing a county medical officer of health when the children of the county were underfed and underclothed. Before they looked after the eyes and teeth of the children they should see that they were properly fed. It is clear that the country is still badly in need of education on the value of health to the community. Apart from the delay in making appointments Ireland's sanitary administration has to face another danger. The salaries offered for county medical officers of health are small, and are not likely to attract men of adequate experience. There is a grave danger that men with paper qualifications only, and without practical experience, may be appointed. Up to the present there has been no public health system in force in Ireland, so that Irish medical men have had little opportunity of gaining experience in their own country. The best hope of acquiring experienced administrative officers may be to attract candidates who have worked in England or elsewhere, but the salaries offered are not likely to achieve this result.

LABELLING OF POISONOUS SUBSTANCES.

ON August 19th, at Shoreham (Sussex) Petty Sessions, a grocer and provision merchant of Lancing was summoned for selling a certain quantity of carbolic disinfectant, containing not more than 3 per cent. of phenol, enclosed in a wrapper that was not distinctly labelled with the words "Poisonous, not to be taken," and did not have the name and address of defendant as the seller thereon. The defendant pleaded not guilty. Evidence of the purchase was given by a representative of the Pharmaceutical Society, who stated that she drew the defendant's attention to the fact that his name should have been on the bottle and that he agreed. She also pointed out that there were also no words to indicate that the contents were poisonous and were not to be taken. The defendant's solicitor produced a bottle and removing the wrapper asked witness if it did not say on the bottle, "Poisonous, not to be taken." Witness agreed, but said it contained no name and address of the seller. The Magistrate's Clerk: "Technically speaking, it should be on the wrapper." Defendant's solicitor said the section of the Pharmacy Act provided that it should not be lawful to sell any substance to which the section applied unless the box, bottle, vessel, wrapper, or cover in which it was contained was labelled with the name of the substance and the word "poisonous." Hence it was only necessary for one or the other to be so marked, and as the label appeared on the bottle the Act was complied with. He added that the bottle revealed the name of the seller—namely, the makers of the solution. The police superintendent pointed out that the Act meant by the seller the person making the sale. The sale was admitted. This lysol solution, said the defendant's solicitor, was barely poisonous, because it contained something less than 3 per cent. of carbolic, but apparently it came within the Order under the Act. Possibly his client had made a mistake in regard to not having his own name and address inscribed. The manufacturers of these substances, as a rule, warned the retailer at the time of purchase that the name of the retailer must be added when the substance was sold to the public. In this case no warning was received, and his client did not know that the substance fell under the Act. The defendant had been in business for 35 years without anything against him. There were no fewer than 965 Orders in Council affecting grocers, and for 35 years he had successfully steered through these 965 Orders in Council only to be held up through not putting his name on a paper wrapper. The police superintendent stated that defendant was a highly respectable tradesman, and that the proceedings were brought as a warning to others. The Justices dismissed the case on payment of costs.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg.-Comdr. P. L. Gibson to *Pembroke*, for R.N. Hospital, Chatham.

ROYAL NAVAL VOLUNTEER RESERVE.

Act. Comdr. R. P. Pim to *Excellent*, Surg.-Lts. A. R. Thomas to *Comus*, for training, and E. E. Henderson to *Vivid*, for R.N. Barracks, Devonport, for training.

Surg. Sub.-Lt. J. A. White promoted to Surg.-Lt.

Probv. Surg. Sub.-Lt. T. Colver to *Victory*, for R.N. Hospital, Haslar, for training.

J. K. Reid, Birkenhead, has been appointed Admiralty Surgeon and Agent for that district.

ROYAL ARMY MEDICAL CORPS.

Maj. N. Cantlie, M.C., half pay list, is restd. to the estabt., with precedence next below H. G. Winter, M.C.

Maj. H. H. Leeson, M.C., R.A.M.C., Res of Off., relinquishes his appt. under Art. 507 (b), Royal Warrant for Pay and Promotion, 1926, and resumes the rank of Lt.-Col.

Maj. (Qr.-Mr.) C. A. Figg, O.B.E., having attained the age for compulsory retirement, is placed on retd. pay.

TERRITORIAL ARMY.

Lt.-Col. (Bt.-Col.) F. Marsh (late R.A.M.C., T.F.), to be Hon. Col., R.A.M.C. Units, 48th (S. Midland) Div.

Lt. E. G. Oastler to be Capt.

W. H. D. Patterson and 2nd Lt. E. H. Brindle (late R. Scots) to be Lts.

ARMY DENTAL CORPS.

Lt. (on prob.) G. E. Nettleship is confirmed in his rank.

ROYAL AIR FORCE.

The undermentioned Flying Officers are granted permanent commissions in this rank: G. H. J. Williams, J. C. Neely J. Kemp.

Flying Officer J. M. Ritchie is promoted to the rank of Flight Lt.

Flying Officer A. C. Lysaght resigns his short service commission.

RESERVE OF AIR FORCE OFFICERS.

Flight Lt. J. D. Driberg is granted a commission in Class D.D.

Squadron Ldr. H. Harvey relinquishes his commission on completion of service and is permitted to retain his rank.

AUXILIARY AIR FORCE.

No. 601 County of London (Bomber) Squadron.—Flight Lt. J. D. Driberg resigns his commission on appointment to the Reserve of Air Force Officers.

Flight Lt. E. D. W. Reid is transferred from General Duties Branch.

INDIAN MEDICAL SERVICE.

Capts. D. P. McDonald, Amar Nath Sharma, and Naval Maneckji Pestonji Dotivala, M.C., to be Majs.

Temp. Lts. Karam Chand Virmani and Tolaram Bhojsing Pahlajani to be Temp. Capts.

Lt.-Col. J. K. S. Fleming retires.

Lts. E. G. Montgomery, G. F. Taylor, and Wajid Ali Khan to be Capts.

Lt. R. A. Haythornthwaite to be Capt. (prov.).

The undermentioned temp. officers are apptd. to permanent commns. as Lts.: Chandra Mani, Lakshman Dass, Prafulla Chandra Dutta, and Trilok Chand Puri.

Capts. to be Majs.: Kombar Ramaswamy Krishnaswami Iyenger, Madho Prasad, Girish Chandra Maitra, J. J. Rooney.

The following Capts. (prov.) are confirmed in their rank: Gurbaksh Singh Chawla, T. A. Malone, W. Scott, Bhagwant Singh Nat, V. A. Edge.

Lt.-Col. H. M. H. Melhuish, D.S.O. retires.

The *London Gazette* of Sept. 6th published under 14 paragraphs from the India Office the amended rules for the promotion and precedence of the Indian Medical Service contained in the Warrant of May 28th, 1913, and in such other Warrants granted since that date as are still in force.

COLONIAL MEDICAL SERVICES.

The following appointments are notified: R. E. Anderson, Medical Officer, Federated Malay States; Miss N. N. Lowther, Lady Medical Officer, Federated Malay States; L. E. Vine, Medical Officer, Federated Malay States; Miss C. D. Williams, Lady Medical Officer, Gold Coast; F. W. W. Fox, Medical Officer, Nigeria; F. Williams, Pathologist, Nigeria.

Appointments.

SCOTT, JOHN A., M.D. Liverp., D.P.H., has been appointed Medical Officer of Health for Shipley.

Vacancies.

For further information refer to the advertisement columns.

Albert Dock Hospital, Connaught-road E.—Surgeon. Also M.O. At rate of £110.

All Saints' Hospital for Genito-Urinary Diseases, Finchley-road, N.W.—Jun. H.S. Also Asst. H.S. At rate of £150 and £100 respectively.

Ashton-under-Lyne, District Infirmary.—H.S. At rate of £150.

Bangor, Carnarvonshire and Anglesey Infirmary.—H.S. £200.

Barrow-in-Furness County Borough.—Asst. M.O.H. and Asst. Tub. O. £600.

Birkenhead General Hospital.—Cas. S. £100.

Birmingham Ear and Throat Hospital.—Third H.S. At rate of £150.

Birmingham and Midland Ear and Throat Hospital.—Asst. Surg. O. £200.

Blackburn and East Lancashire Royal Infirmary.—Res. H.P. £150. Also 4th H.S. £130.

Bournemouth, Royal Victoria and West Hants Hospital.—Two H.S.'s. Each at rate of £120.

Bradford, Royal Eye and Ear Hospital.—Jun. H.S. £120.

Bristol City and County Mental Hospital.—2nd Asst. M.O. £500. Also 3rd Asst. M.O. £350.

Cape Town University.—Asst. Anatomist. £750.

Cardiff Royal Infirmary.—Gynæcological H.S. Also Ophthalmic H.S. At rate of £50 and £75 respectively.

Carlisle, Cumberland Infirmary.—H.P. £155.

Chelmsfield and Essex Hospital.—Res. M.O. At rate of £150.

Chichester Royal West Sussex Hospital.—Jun. H.S. £150.

Coventry City.—M.O.H. £1225.

Croydon General Hospital.—2nd Asst. for the Pathological and Bacteriological Laboratory. £3 10*s.* per week.

Cyprus, Pendayia Hospital.—Surgeon-Physician. £25 per month.

Dorchester, Dorset County Hospital.—H.S. At rate of £120.

Dreadnought Hospital, Greenwich.—H.P. and H.S. Each at rate of £110.

Dublin University, School of Physic, Trinity College.—Montgomery Lecturer in Ophthalmology. £150.

East Ham Memorial Hospital, Shrewsbury-road, E.—Res. M.O. At rate of £200.

East London Hospital for Children, &c., Shadwell, E.—Res. Cas. O. At rate of £125.

Evelina Hospital for Children, Southwark, S.E.—H.S. At rate of £120.

Freemasons Hospital and Nursing Home, 237, Fulham-road, Chelsea, S.W.—Res. M.O. At rate of £250.

Gloucester, Gloucestershire Royal Infirmary, &c.—Hon. S. to Ear, Nose and Throat Dept.

Great Yarmouth General Hospital.—Sen. H.S. £150.

Grimsby County Borough and Port of.—Part-time Clin. Tuberculosis O. and Assist. M.O.H. £750.

Guildford, Royal Surrey County Hospital.—H.S. £150.

Hampstead Parish of St. John, New End Hospital.—Jun. Res. Asst. M.O. At rate of £200.

Hospital for Sick Children, Great Ormond-street, W.C.—Asst. Path. and Research Fellow. £450. Also H.S. and H.P. Each at rate of £100.

Hull Royal Infirmary.—Asst. H.P. At rate of £130.

Indian Research Fund Association, Simla.—Bacteriologist. Also Research Worker. Each Rs.1500 per mensem.

Isleworth, West Middlesex Hospital.—Res. Asst. Med. Supt. and Asst. M.O. £450.

King's College Hospital, Denmark Hill, S.E.—Clinical Assistantships.

King's Lynn, West Norfolk and Lynn Hospital.—Sen. H.S. Also Jun. H.S. At rate of £150 and £100 respectively.

Lewisham Metropolitan Borough.—Asst. M.O.H. and Maternity and Child Welfare M.O. £650.

Liverpool, St. Paul's Hospital, Oldhall-street.—H.S. £120.

London Jewish Hospital, Stepney Green, E.—Hon. Asst. S. for Gynæcological Dept., Hon. Asst. Radiologist. Also Hon. M.O. for Actino-Therapeutic Dept.

London Lock Hospital, 91, Dean-street, W.—H.S. At rate of £200.

London Temperance Hospital, Hampstead-road, N.W.—Res. M.O. At rate of £175.

Manchester, Baguley Sanatorium.—Asst. M.O. £350.

Manchester Babies' Hospital, Burnage-lane, Levenshulme.—Jun. Res. M.O. At rate of £50.

Manchester, Salford Royal Hospital.—Two H.S.'s. Also Cas. H.S. Each at rate of £125

Margate, Royal Sea Bathing Hospital.—H.S. At rate of £100.

Northampton, Northamptonshire County Council.—M.O.H. and School M.O. £1,100.

Norwich, Jenny Lind Hospital for Children.—Res. M.O. £120.

Norwich, Norfolk and Norwich Hospital.—H.S. £120.

Nottingham Children's Hospital.—Res. H.P. At rate of £150.

Nottingham General Hospital.—H.P. Also 2nd Cas O. Each at rate of £150.

Otago and Dunedin University Hospital, New Zealand.—Sen. Res. M.O. £500.

Port Said, British Hospital.—Res. A.M.O. £350.

Princess Louise Kensington Hospital for Children, North Kensington.—Hon. Radiologist.

Prince of Wales's General Hospital, Tottenham, N.—Sen. H.P. Sen. H.S., and Special H.S. Each at rate of £120. Also Jun. H.P., and Two Jun. H.S.'s. Each at rate of £90.

Rotherham Hospital.—H.S. £180.

Queen's Hospital for Children, Hackney-road, E.—H.P. Also Cas. O. Each at rate of £100.

Royal Chest Hospital, City-road, E.C.—Res. M.O. At rate of £150. Also Out-patient M.O. and H.P. Each at rate of £100.

Royal Dental Hospital of London, 32, Leicester-square, W.C.—Hon. Anæsthetist.

St. Leonards-on-Sea, Buchanan Hospital.—Jun. H.S. £125.

South London Hospital for Women, South Side, Clapham Common, S.W.—H.P. Also 3 H.S.'s. Each at rate of £50.

Swansea Hospital.—H.S. £150.

Swindon Corporation.—Asst. M.O.H. £600.

Talgarth, Breconshire, South Wales Sanatorium.—Sen. Asst. M.O. £350.

Torquay, Torbay Hospital.—H.S. £175.

Tunbridge Wells and Counties General Hospital.—H.S. £160.

Worcester General Hospital.—Jun. Res. M.O. £120.

The Chief Inspector of Factories announces a vacant appointment for a Certifying Factory Surgeon at Portland (Dorset).

Births, Marriages, and Deaths.

BIRTHS.

GILDING.—On Sept. 5th, the wife of H. P. Gilding, B.M., B.Ch. Oxf., of a daughter.

HORROCKS.—At a nursing home, Manchester, the wife of F. S. Horrocks, M.B., Ch.B. Manch., of Gravesend, of a daughter.

HURRELL.—On Sept. 6th, at the Penlea Nursing Home, Newcastle-upon-Tyne, to Dr. and Mrs. George Hurrell, 31, Deneholm, Monkseaton—a daughter.

TAUNTON.—On Sept. 3rd, at Campbell-road, Hanwell, W., the wife of R. E. M. Taunton, M.B., Ch.B. Edin., of a daughter.

MARRIAGES.

COOKE—COWIE.—On Sept. 5th, 1929, at the Parish Church, Banff, by the Rev. D. Findlay Clarke, B.D., Robert Victor Cooke, M.B., Ch.B. Bristol, F.R.C.S. Eng., eldest son of Mr. and Mrs. John Cooke, Berkeley, Gloucestershire, to Betty Cowie, M.D., B.S. Lond., M.R.C.P. Lond., elder daughter of Hugh Gordon Cowie, M.A., M.D., Banff, Scotland.

FARR—EMERY.—On Sept. 2nd, at Holy Trinity, Coombe Down, E. A. Farr, M.R.C.S. Eng., L.R.C.P. Lond., of Andover, to S. A. Emery, of Bath.

GREGORSON—HOWE.—On Sept. 4th, at All Saints', Horsford Parish Church, Norwich, Albert William Gregorson, M.D. Glasg., to Edith Evelyn Howe.

WILSON—SMITH.—On August 31st, at Tiviot Dale Chapel, Stockport, John Greenwood Wilson, M.D. Lond., M.R.C.P. Lond., younger son of the Rev. John Wilson, M.B.E., D.D., of Woolwich, to Wenda Margaret Hithersay, eldest daughter of Ernest J. Smith, M.A., LL.B., of Disley, Cheshire.

DEATHS.

AMBLER.—On Sept. 9th, at Ampthill, R. Ambler, Esq., F.R.C.S., L.R.C.P. & S. Ed., L.R.F.P.S. Glasg., aged 72, last surviving son of Dr. E. H. Ambler, of Hemel Hempstead.

CAIGER.—On Sept. 5th, suddenly in Scotland, Frederick Foord Caiger, M.D. Lond., F.R.C.P., late chief medical officer, Infectious Hospitals Service, Metropolitan Asylums Board, aged 69 years.

CRAIG.—On July 26th, at the Cottage Hospital, Fort Beaufort, Peter Latimer Craig, M.A., B.Sc., M.B., C.M. Glasg., D.P.H. Camb., of Balfour, Cape Province, S. Africa.

HARRIS.—On Sept. 6th, at Hartwood House, Chorley, Lancashire, James Alfred Harris, M.D. Lond.

LOCHHEAD.—On Sept. 2nd, at Desenzano, Italy, after a short illness, Mathew Lochhead, M.B., C.M. Glasg., B.Sc., of Snaxland, Clovelly, Devon.

SHARKEY.—On Sept. 6th, at Portland-place, London, Sir Seymour J. Sharkey, M.A., M.D. Oxf., F.R.C.P. Lond., consulting physician to St. Thomas's Hospital, aged 82 years.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

ENLARGEMENT OF DEAL HOSPITAL.—The Deal and Walmer War Memorial Hospital, which last year had a credit balance of over £1100, is to be enlarged by the erection of a nurses' home at the back, thus enabling the whole of the present building to be used as wards. The cost will be £10,000.

ST. BARTHOLOMEW'S HOSPITAL.—In his annual report, Lord Stanmore, the treasurer, states that the erection of the surgical ward block is making good progress and that the buildings should be ready for occupation by the beginning of next year. There will be five surgical units, each comprising a male and a female ward of 22 beds, with two small wards of one and two beds respectively attached to each section. Each unit has its own operating theatre, demonstration room, examination room, and offices. These buildings form part of the complete scheme of reconstruction. The Governors have approved a southern extension of Queen Mary's Home for the nurses, which will provide for 51 additional nurses. The in-patients last year numbered 9868 and cost £16 1*s.* 4*d.* each; the 94,303 new out-patients cost 11*s.* 1*d.* each. The income was £198,765 and the expenditure £201,774.

Medical News.

DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH.—Lord Rayleigh, F.R.S., Sir Arthur Balfour, Sir William Bragg, F.R.S., and Sir James Walker, F.R.S., have been appointed members of the Advisory Council in succession to Sir Harold Carpenter, F.R.S., Mr. G. C. Clayton, Ph.D., Sir Richard Glazebrook, F.R.S., and Sir James Jeans, Sec. R.S., who have retired on completion of their terms of office.

Dr. Leonard Nicholas Robinson, C.B.E., President of the Egyptian Medical Commission in Paris, has been granted His Majesty's royal licence and authority to wear the Insignia of the Third Class of the Order of the Nile, conferred upon him by the King of Egypt, in recognition of valuable services rendered by him.

TORBAY HOSPITAL CONTRIBUTORY SCHEME.—At the end of the first four months' working of this scheme the membership had reached nearly 15,000.

PAIGNTON HOSPITAL.—An enlargement of this hospital was opened last week by Mrs. J. A. Watson. It consists of a new wing, containing a men's ward, a women's ward, and accommodation for paying patients. The work has cost £15,000.

ANCOATS HOSPITAL, MANCHESTER.—A course of post-graduate lectures and demonstrations will be given during the Michaelmas Term on Thursday afternoons at 4.15 P.M., commencing on Oct. 17th, when Dr. W. J. S. Reid will speak on Hæmorrhagic Diatheses. A notice of each lecture will be inserted in THE LANCET of the preceding week. All medical graduates and senior students are invited, and there is no fee for the course. In addition to this course a post-graduate day of clinical teaching will be given by the honorary staff every Thursday during the Lent Term as part of the post-graduate scheme of the University of Manchester.

ASSOCIATION OF SPECIAL LIBRARIES AND INFORMATION BUREAUX.—The programme of the sixth annual conference, to be held at Trinity College, Cambridge, from Sept. 20th–23rd, has been issued. Among the subjects to be considered are the Ideal Form of a Journal from the Librarian's Point of View, Duplication and Infringement of Copyright, Technical English, the Training of Special Librarians, the Indexing and Classifying of Individual Collections of Data, and International Organisation of Information Services. A dinner will be held on Sept. 20th, when Sir J. J. Thomson, F.R.S., president-elect of the Association, will give an address. Full particulars can be obtained by those interested from the Secretary, A.S.L.I.B., 26, Bedford-square, London, W.C.

OPTICAL CONGRESS.—A congress and trade exhibition is being held at the Northampton Polytechnic Institute, St. John-street, London, E.C., to commemorate the tercentenary of the granting of the Royal Charter to the spectacle makers of the City of London. The congress was opened on Sept. 10th by Sir Osborn Holmden, Master of the Worshipful Company of Spectacle Makers. He said that at the end of last century the Company had decided to institute an examination for the craft, and at the present time nearly 2500 opticians held the Company's diploma. It was the object of the Company and of other optical bodies to raise the code of ethical practice among opticians and to ensure that persons afflicted by disease and needing treatment should be referred to ophthalmic surgeons.

"THE MIDLAND HOMŒOPATHIC AND GENERAL HOSPITAL" is the new name of the institution formerly known as the Birmingham and Midland Homœopathic Hospital and Dispensary. The 60 beds are always full, and 710 in-patients were treated last year; there were 3745 out-patients and 682 operations. The finances show an annual loss. The average cost per in-patient per week was £3 2*s*. 10*d*., as against £2 9*s*. 4*d*. in the previous year.

THE SHEFFIELD HOSPITALS.—The seventh annual report of the Sheffield Hospitals Council, which administers the penny-in-the-pound scheme, states that the total number of patients admitted to the four institutions last year was 15,433. Children, unemployed, and patients unable to pay towards their maintenance numbered 6051, and for these persons and the necessitous poor the Council expended £60,000. The casualties exceeded 49,000, an average of 134 per day; out-patients totalled just under 74,000. At the end of the year the waiting list contained 2687 names and the accumulated debt to the bankers exceeded £59,000,

Notes, Comments, and Abstracts.

MEDICAL EXAMINATION OF CANDIDATES FOR THE POLICE FORCE IN 1844.

THE standards of fitness for candidates for the most physically exacting of our national services were the subject of comment in our columns last week. We have received from Dr. A. P. Gibbons a copy of the instructions issued nearly a century ago for the guidance of the surgeon to the police force of the City of London, on his duties when examining candidates for the Force, and it is interesting to compare the criteria of sturdy vigour then established with more modern ones. The document, dated 1844, reads as follows:—

Instructions for the Guidance of the Surgeon.

I. The leading object of the following instructions is to guard against the admission of candidates into the Force whose health of body or mind is unsound who have any suspected taint of disease or disability and who, at the period of Inspection, are incapable of undergoing fatigue. The Duties of the Force to be efficiently performed necessarily require that each Member should enjoy sound Bodily health, as well as a fair proportion of physical strength and an appearance likely to command obedience.

II. The Surgeon is from his knowledge of the Duties of the Members of the Force, presumed to be capable of forming a correct opinion of the health of Candidates their capacity for exertion and general efficiency. The external characters of a sound constitution and efficient limbs may be briefly stated, viz., a tolerably just proportion between the trunk and different Members of the Body a Countenance expressive of health with a lively eye—Skin firm and elastic—Lips red—Teeth in good condition—Voice strong—Chest capacious and well formed—Belly lank—Limbs muscular—Feet arched and of a moderate length—Hands rather large than small—The reverse of these marks of a good constitution and efficiency may be considered to indicate infirm health or inefficiency.

III. The question of fitness or unfitness of a candidate must in a great measure be determined by the discretion of the Surgeon for no rule can be formed of so definite a character as to dispense with the exercise of the deliberate reflection and judgment of a Medical Man.

IV. As policemen are liable to be exposed to frequent vicissitudes of weather and to undergo much fatigue Candidates should possess vigorous constitutions and great muscular capability; hence no Man ought to be approved for the Service whose health is unsound and who does not possess adequate strength for the duties which he may be called upon to perform.

V. The following enumeration of the more common causes for which Candidates should be rejected when any of them exist to such a degree as will immediately, or in all probability may at no very distant period impair a Man's efficiency, is intended as a general guide to the Surgeon in the performance of the duty of inspecting Candidates.

1. Feeble constitution, unsound health from whatever cause, indications of former disease, as Leech bites, traces of Blisters, thereby showing a liability to infirm health, nodes, glandular swellings, or other symptoms of Scrofula, &c.
2. Weak or disordered Intellect.
3. Chronic cutaneous affections, especially of the Scalp.
4. Severe injuries of the Bones of the Head.
5. Impaired vision from whatever cause, or Inflamatory affections of the Eyelids, immobility or irregularity of the Iris, Fistula Lachrymalis.
6. Deafness or copious discharge from the Ears.
7. Loss of many Teeth or the Teeth generally unsound.
8. Impediment of Speech.
9. Want of due capacity of the Chest and any other Indication of a liability to pulmonic Disease.
10. Impaired or inadequate efficiency of one or both of the superior extremities on account of palsy, old fractures, especially of the Clavicle, Contraction of a Joint, Mutilation, Extenuation, Deformity, Ganglions, &c., &c.
11. Lateral and other Curvatures of the Spine.
12. Hernia or a tendency to that disability from preternatural enlargement of the abdominal ring.
13. A varicose state of the Veins of the Scrotum or Spermatic Cord, Sarcocele, Hydrocele, Hemorrhoids, Fistula in perineo.
14. Impaired or inadequate efficiency of one or both of the inferior extremities on account of Varicose Veins, old Fractures, Malformations (flat feet, &c.), Palsy or Lameness, Contraction, Mutilation, Extenuation, Enlargement, unequal length, Bunions overlying or supernumerary Toes, Ganglions, &c., &c.

15. Ulcers or unsound cicatrices of Ulcers likely to break out afresh.

16. Diseases whether Acute or Chronic for which Medical treatment is required.

VI. Every Candidate is to be undressed before Inspection and it is directed that the Examination shall be conducted agreeably to the following Routine, by which means blemishes are not likely to escape detection.

VII. Upon entering the Inspection Room the Candidate is to walk a few times pretty smartly across the Apartment for the purpose of showing that he has a perfect use of his lower extremities. He is then to be halted and set up in the position of a Soldier under Arms with the Knees about an inch apart and examined both in front and rear from head to foot. Should no material defect be discovered during this Survey the Examination may go on. The Candidate is then to perform the following Evolutions:—to extend the arms at right angles with the trunk of the Body, then to touch the Shoulders with the fingers, next to place the backs of the hands together above the head in this position let him cough, while at the same time the Surgeon's hand is to be applied to the rings of the external oblique muscles. Let the Surgeon examine the Spermatic Cord and Testes, then pass his hands over the Bones of the Legs. The Candidate is next to be made to stand upon one foot, and move the ankle joint of each extremity alternately; when any doubt is entertained respecting the efficiency of this joint or any part of an inferior extremity he should be made to test his strength by hopping upon the suspected Limb for a short period, and the size and aspect of the corresponding joint or part of the opposite Limb should also be accurately compared. He is next to kneel on one knee, then on the other and subsequently on both knees. Let him then stoop forwards and place his hands on the Ground and while in this position it ought to be ascertained whether he be affected with Hemorrhoids. He is then to extend the superior extremities forward for the purpose of having his arms and hands examined, and with this intention he is to perform flexion and extension of the fingers and to rotate the forearm. The Head is next to be examined, including the scalp, ears, eyes, nose, mouth; the Surgeon is then to ascertain that he possesses the function of hearing, and the faculty of distinct enunciation. In regard to the mental faculties the Surgeon should invariably ask a Candidate a few short questions as what occupation he had previously followed, &c., &c., or adopt any other means which he may deem necessary to ascertain the condition of the intellect.

VIII. When a Candidate is approved the attestation is to be filled up and signed by the Surgeon.

IX. The Book required to be kept in regard to this Branch of the duty of the Surgeon is, a register of Candidates which is to be ruled so as to contain the following heads: (*a*) Date of examination. (*b*) Name of each Candidate. (*c*) Age. (*d*) Country of Birth (as England, Ireland or Scotland). (*e*) Previous occupation or Station in life. (*f*) Remarks and Observations.

Causes of Rejection.—Unsound Health. Weak Intellect. Traces of Scrofula. Muscular Tenuity. Chronic Cutaneous affections. Specks on the Cornea; Cataract. Deafness. Loss of many Teeth. Defective condition of the superior extremities in consequence of old fractures, contractions, &c. Deformed Spine. Hernia Inguinal on either side. Laxity of the ring of the external Oblique Muscles on either side. Varicose Veins, left or right Spermatic Cord. Disease of the left Testicle. Disease of the right Testicle. Hydrocele of either testicle. Defective condition of the Inferior Extremities in consequence of old fractures. Malformation. Varicose Veins of either legs. Ulcers, Wounds or Cicatrices of legs.

Modern Practice.

We understand that at the present time the question of fitness or otherwise of candidates for the City of London Police is largely left to the examining surgeon. Each candidate fills up a form on which he sets out his name, age, vaccination history, notes of illnesses for which medical attention has been required, and reports any history of hæmoptysis, fits, rheumatic fever, or discharge from the ears. He is asked on the same form whether he or any near relative has been afflicted with consumption, epilepsy, insanity, or nervous debility, whether he has ever been ruptured, and what, if his parents are not living, was the cause of their death. The surgeon then examines the candidates stripped, so that varicose veins, hernia, and deformities can be easily detected. His sight and hearing must be good and his organs sound; he should be six feet or more in height, have a mean chest measurement of 36 in., and weigh 11 stone or more when stripped. The use of the stethoscope has, of course, made unnecessary such full instructions as were offered to the surgeon of 1844, and has enabled a better estimate of the function of the respiratory and circulatory systems to be made, but it is remarkable how little our standards have altered since the early instructions were formulated.

SOME ASPECTS OF HOSPITAL PLANNING.

IN an address with this title, recently delivered before the Rotary Club at Welwyn Garden City, Mr. A. W. Kenyon, F.R.I.B.A., spoke of the choice of site for a general hospital, more especially as it might apply to a garden city. One of the most important factors was the selection of a really beautiful site, a point which often appeared to be overlooked, leaving architects to face the problem of fitting a hospital on to a difficult and unsuitable site. There were many reasons why this was so. The land might be given by a philanthropist who did not fully appreciate the requirements of future development, or the land might not be available in the particular district in which the hospital was required. In Welwyn, however, it should be quite possible to select an ideal site. It was essential in the first instance that the site should be large enough for future as well as present demands. There should be a broad frontage facing south and the ground fall gently towards the south, with access roads from the north and east, where there should be the shelter of a belt of trees. The amount of land required would depend on the type and size of the hospital to be erected. The modern tendency was to secure smaller hospitals in towns where noise is daily on the increase, and to make them tributary to larger hospitals in the country where fresh air can be obtained and plenty of space secured for gardens for convalescents. This ideal, he thought, should appeal to places like Welwyn which were making efforts to bring works and the workers from congested and noisy towns into the better environment of the country. The hospital of the future was going to be a very efficient building, which would provide for: (*a*) general patients who would come under the voluntary system; (*b*) paying patients who could only afford to pay a contribution towards the services rendered to them; (*c*) private paying patients who would be able to pay adequately for these services; (*d*) smaller wards; (*e*) special blocks, all of which were tending to increase the size of hospitals. If Welwyn was going to provide a hospital suitable for the county and so to relieve the more thickly populated towns, there was hardly any limit to the ultimate number of beds required. Having arrived at the probable number of beds ultimately needed, the hospital should be planned for the full accommodation, even if a small portion only was to be built. It was extremely difficult to add to an existing building if the future extension had not been thought out. There was the psychological effect to bear in mind, for donors would often contribute to some special department or would contribute towards finishing off a certain portion of the building. In new towns like Welwyn, run on idealistic principles, it should certainly be possible to plan a new hospital rather than adapt an existing building. To do the latter would be to find that when everything possible had been done, it was more than likely to prove a makeshift, uneconomical in planning, difficult to administer, and expensive to run.

PAINFUL FIBROSITIC NODULES.

To the Editor of THE LANCET.

SIR,—I offer the following suggestions for treatment. (1) Injections of fibrolysin; (2) paint painful nodules with analgit (the Analgit Co., 102, Wilmslow-road, Didsbury, Manchester); (3) a sodium iodide and sodium salicylate mixture; (4) soneryl grs. ii. at bedtime with a hot drink, to ensure sleep till other remedies get to work.

I am, Sir, yours faithfully,
C. G. S. BARONSFEATHER, M.D.

Bournemouth West, Sept. 6th, 1929.

A COURTEOUS ACT.

WE are in a position to supply the information desired by the Leicester Health Committee on the whereabouts of Dr. W. B. Castle, who earned the gratitude of the Committee by his services to a fellow passenger on the Ostend boat. Dr. Castle sailed on Sept. 7th for Boston, where he holds an appointment at the City Hospital, to resume the experimental work on the association of achlorhydria with pernicious anæmia which he reported to the Section of Medicine of the Royal Society of Medicine on June 11th. Dr. Castle's courtesy in escorting a woman whose labour had begun prematurely to her home in Leicester, and in attending her until he could procure suitable medical and nursing attention, was especially noteworthy since the incident curtailed his final visit to London before he sailed for America.

X.Y.—We understand that keraphen (or tetraiodophthalophenon), a preparation given by the mouth as a preliminary to cholecystography (see THE LANCET, August 24th, p. 400), may be obtained from Mr. James Picker, 686, Lexington-avenue, New York.

WE are informed that Prunol Products, Ltd. is continuing to place on the market the proprietary remedy for constipation and kindred ills known as prunol.